

AMERICAN GAS ASSOCIATION

Monthly



AUGUST
1949



Good
training
tools
build

SALES!

Today's market for home appliances offers your company its greatest opportunity—and its greatest competition. This market will belong to those who build an aggressive, well-trained and well-informed sales force.

The Course in Residential Gas Salesmanship, developed for A.G.A. by Tradeways, Inc., offers a complete and tailor-made program for just such effective sales training. Employing the latest training techniques, it is designed not only for your present and future salesmen, but also to give your dealer allies the type of lead-building help they need.

Price of the basic group, including sound-slide films and material for ten enrollments, is \$200. Price of additional individual enrollments, \$10 each.

AMERICAN GAS ASSOCIATION, 420 LEXINGTON AVE., NEW YORK 17, N. Y.

Basic unit of A.G.A. Residential Gas Salesmanship Course and minimum order, consisting of material for ten enrollments and for six training sessions comprising:

- 12 SOUND-SLIDE FILMS WITH RECORDINGS
- 60 SALES CASES, TO AROUSE INTEREST
- 60 PRINTED TEXTS, AMPLY ILLUSTRATED
- 10 LOOSE-LEAF BINDERS FOR TEXTS AND LOCAL MATERIAL
- A LEADER'S GUIDE FOR CONDUCTING MEETINGS

UNIT 1

● Win confidence quickly—Convince customers by selling methods do increase sales. Start with the right approach... Find out each customer's specific needs. How to get people to listen to you. How to get people to believe you.

UNIT 2

● Sell the service—What do people really want? ... Sell convenience, cleanliness, economy and beauty of modern gas appliances ... Sell the idea of a coordinated gas kitchen. Sell the benefits of gas for the jobs in the home.

UNIT 3

● Show and explain—Know gas appliances thoroughly ... "Salesmen" your demonstrations ... Show how each appliance performs ... Explain how it will benefit the customer ... Get customer to participate in demonstration ... Sign up the easy way.

UNIT 4

● Complete the sale—The average customer hesitates before buying. Your best move is to keep on selling ... "Personalize" the benefits to the customer ... Make the price or estimate lead to the close ... Close the normal sales.

UNIT 5

● Close the hard ones—Expect resistance and prepare for it ... Handle difficult customers smoothly ... Turn awkward situations in your stride. Use objections to help the sale. Choose the correct closing method.

UNIT 6

● Plan for more sales—Salesmen sell your own time; it pays ... Go after multiple sales ... Systematize prospect-hunting ... Pick up leads from all sources ...



Pat Powell, Southern California Gas Co., admiring range in New Freedom Gas Kitchen at Los Angeles Home Show. Photo by Mel Jones

THE question, how to attend a meeting, or how to be a successful member of a trade association, is answered in lucid terms this month. According to E. H. Rose, the answer is "give and ye shall receive". . . . With plans for the annual convention taking shape and nominations for Association officers in the hands of the membership, the subject of participation is both basic and timely. . . . Summer this year should prove a valuable interval for the individual gas man—an unexcelled opportunity to assay his own participation in his job and his industry. A frank analysis now will enable him to take full advantage of personal contacts at the annual convention in Chicago this fall. . . . As the individual profits from the experience of his comrades, so the industry benefits from accomplishments in related fields. Two feature articles in this issue disclose the value of jet propulsion and synthetic liquid fuels research and their significance to the gas industry. In addition, reports of A. G. A. meetings throughout the country make a profitable wind-up to a spring season of unsurpassed activity. . . . Best wishes for a happy and profitable summer.

JAMES M. BEALL
MANAGER, PUBLICATIONS
JAC A. CUSHMAN
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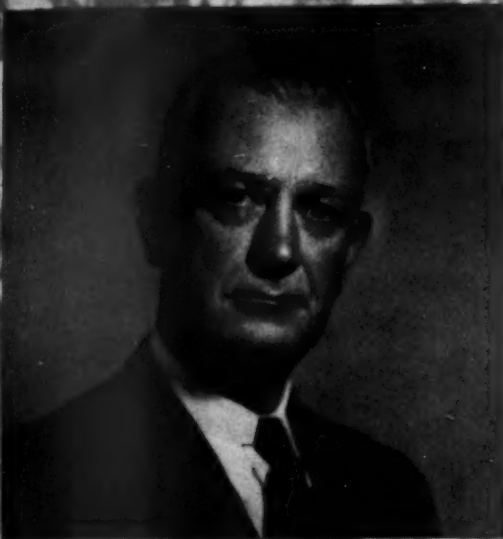
THE MONTHLY IS INDEXED BY THE INDUSTRIAL ARTS INDEX

VOL. 31

NOS. 7 AND 8

• Subscription \$3.00 a year—Published eleven times a year by the American Gas Association, Inc. Publication Office, American Building, Brattleboro, Vt. Publication is monthly except July and August which is a bi-monthly issue. Address all communications to American Building, Brattleboro, Vermont, or to 420 Lexington Ave., New York 17, N. Y. All manuscript copy for publication should be sent to the editorial offices in New York. The Association does not hold itself responsible for statements and opinions contained in papers and discussions appearing herein. Entered as Second Class Matter at the Post Office at Brattleboro, Vermont, Feb. 10th, 1922, under the Act of March 3, 1879. Cable addresses: American Gas Association, "Amerigas, New York"; American Gas Association Testing Laboratories, "Amerigaslab, Cleveland."

For President



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For Vice-President



D. A. HULCY



GEORGE F. MITCHELL

For Director



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H. R. COOK, JR.



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A.G.A. nominates for 1949-1950

Thirty-three prominent gas industry executives have been nominated for top positions in American Gas Association for the 1949-1950 fiscal year. Nominations for Association officers, directors, and section officers will be placed before the membership for election at the A. G. A. annual convention in Chicago, October 17-20, 1949.

In accordance with provisions of the Association's by-laws, announcement is hereby made of the report of the General Nominating Committee which was elected at the Atlantic City convention last October. Any 50 company members may make additional nominations on or before August 17, 1949.

Lester J. Eck, vice-president, Minneapolis Gas Co., Minneapolis, Minn., is chairman of the General Nominating Committee. Serving with Mr. Eck are Charles E. Bennett, president, The Manufacturers Light & Heat Co., Pittsburgh, Pa.; Arthur F. Bridge, president & general manager, Southern Counties Gas Co., Los Angeles, Calif.; H. K. Griffin, vice-president & general manager, Mississippi Gas Co., Meridian, Miss.; George S. Hawley, president, The Bridgeport Gas Light Co., Bridgeport, Conn.; Willard F. Rockwell, chairman of board, Rockwell Manufacturing Co., Pittsburgh.

Four industry officials have been nominated to serve as A. G. A. officers for a one-year term, 15 officials have been nominated for a two-year term as directors, and one to fill a directorship expiring in October 1950. Five gas men have been named to serve a one-year term as section chairmen and two gas men to serve a similar term as general committee chairmen. The former, if elected at the October convention, will automatically become sectional vice-presidents.

(Continued on next page)

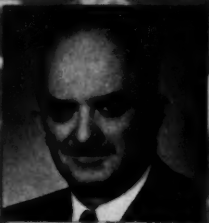
For Chairman



DR. H. W. ROPER
Accounting Section



W. PRESTON AMBROSE
Residential Gas Section



ERNEST G. CAMPBELL
Technical Section



CARL A. SCHLEGEL
Manufacturers' Section



D. W. REEVES
Industrial and
Commercial Gas Section



ARTHUR F. SMITH
Laboratories
Managing Committee



R. C. BARNETT
Publicity and
Advertising Committee

For Vice-Chairman



ALAN A. CULLMAN
Accounting Section



C. H. MOORE
Residential Gas Section



R. VAN VLIET
Technical Section



CARL H. LEBERG
Industrial and
Commercial Gas Section



CHARLES E. BENNETT
Laboratories
Managing Committee



C. J. ALLEN
Publicity and
Advertising Committee

The following nominations are brought to the attention of the membership:

For President—Hugh H. Cuthrell, vice-president, The Brooklyn Union Gas Co., Brooklyn, New York

For First Vice-President—D. A. Hulcy, president, Lone Star Gas Co., Dallas, Texas

For Second Vice-President—George F. Mitchell, president, The Peoples Gas Light & Coke Co., Chicago, Illinois

For Treasurer—Edward F. Barrett, president, Long Island Lighting Co., Mineola, New York

For Director—two-year term expiring October 1951—Edward G. Boyer, manager, gas department, Philadelphia Electric Co., Philadelphia, Pennsylvania

H. R. Cook, Jr., vice-president, Consolidated Gas Electric Light & Power Co. of Baltimore, Baltimore, Maryland

E. H. Eacker, president, Boston Consolidated Gas Co., Boston, Massachusetts

Joseph N. Greene, president, Alabama Gas Corp., Birmingham, Alabama

Stanley H. Hobson, president, Geo. D. Roper Corp., Rockford, Illinois

R. H. Lewis, president, Ruud Manufacturing Co., Pittsburgh, Pennsylvania

Frederick A. Lydecker, vice-president in charge of gas operation, Public Service Electric & Gas Co., Newark, New Jersey

J. F. Merriam, executive vice-president, Northern Natural Gas Co., Omaha, Nebraska

Dean H. Mitchell, president, Northern Indiana Public Service Co., Hammond, Indiana

James S. Moulton, vice-president and executive engineer, Pacific Gas & Electric Co., San Francisco, California

J. French Robinson, president, The East Ohio Gas Co., Cleveland, Ohio

Paul R. Taylor, vice-president, Consolidated Electric & Gas Co., New York, New York

Thomas Weir, general manager, Union Gas Company of Canada Ltd., Chatham, Ontario

Harry K. Wrench, president and general manager, Minneapolis Gas Co., Minneapolis, Minnesota

(Continued on page 32)

Powerful theme for convention



Chicago, "the hub," whose skyline is shown above, will become the center of attention for A. G. A. members during annual convention, October 17-20, 1949

The popular "Gas Has Got It" slogan has been selected as the theme of American Gas Association's annual convention in Chicago, October 17-20, 1949. The A. G. A. General Convention Committee under the chairmanship of George F. Mitchell, president, The Peoples Gas Light & Coke Co., Chicago, is arranging to have banners, posters, exhibits, and many of the scheduled speeches, further emphasize the convention theme—a slogan that has been nationally popularized through the industry's coordinated advertising and promotion program during the past year.

Attendance at the convention is estimated at about 6,000, based on the fact that more than 2,500 advance reservations already have been placed by the A. G. A. Convention Room Reservation Bureau. Although accommodation commitments made by the Palmer House, Morrison Hotel and Sherman Hotel are believed to be adequate, members of the Association are urged to make reservations at an early date. Application blanks for hotel reservations will be furnished by A. G. A. Headquarters on request. Completed applications should be mailed as soon as possible to A. G. A. Convention Room Reservation Bureau, Room

808, 105 West Madison Street, Chicago, Illinois. Members are requested to select as their first choice the headquarters hotel of the Section with which they are most closely allied. Manufacturers also are asked to choose the hotel of the Section in which their interests center.

Preliminary plans being considered by the Convention Committee indicate an exceptional program embracing promotional, inspirational and industry and business subjects presented by outstanding speakers from within and outside the gas industry.

On the General Sessions program the A. G. A. Accident Prevention Committee will sponsor an address, "Safety Is Your Business," by Ned H. Dearborn, president, National Safety Council.

General convention plans call for meetings of the Natural Gas Department on Monday morning, October 17, and a meeting of the Manufactured Gas Department on Monday afternoon, both meetings to be held at the Palmer House. Problems and plans of the industry relating to load factors, fuel situations, new gas-making processes, and other natural and manufactured gas subjects will be presented at these Monday meetings.

Chairman Mitchell has announced that, in addition to speakers on general sessions programs sponsored by Sections and Committees, the general program will include Robert W. Hendee, president, Colorado Interstate Gas Co., and president, A. G. A., who will deliver the presidential address entitled "The '49 Round Up," and Frank J. Nugent, president, Gas Appliance Manufacturers Association, who will review the gas appliance situation from the manufacturers' standpoint. Harry S. Beers, vice-president, Aetna Life Insurance Co., will talk on group pension and annuity plans, and Henry T. Heald, president, Illinois Institute of Technology, will discuss new developments in technical education of employees.

The Accounting Section will use the Palmer House as its headquarters and will conduct separate meetings on the afternoons of Tuesday, Wednesday and Thursday, October 18, 19 and 20.

The Tuesday meeting will be a combined general and customer accounting session. Philip E. Eddy, vice-president in charge of customer service, The Peoples Gas Light & Coke Co., will reveal interesting highlights on customer relations. Leland Balch, secretary & treasurer,

Lowell Gas Light Co., Lowell, Mass. will give a paper "Accounting for Bottled Gas," and J. F. Farley, New York State Electric and Gas Corp., Ithaca, N. Y. will discuss accounting employee relations. A. G. Burnett, New York Power & Light Corp., Albany, N. Y. will discuss the qualified rules of public utility accounting.

The Wednesday afternoon session will be devoted to separate meetings on property records, materials and supplies, taxation accounting, customer accounting and general accounting subjects.

On Thursday at noon there will be a general luncheon for all those Accounting Section members present, followed by a general meeting and election of officers. Principal speakers at this luncheon will be J. B. Jeming, consultant, who will discuss the application of depreciation rates, and L. E. Frailey, nationally-known collection-letter expert, who will present a comprehensive paper, resulting from a cross-section of collection letters presently in use in the public utility accounting field.

Convention activities of the Industrial and Commercial Gas Section will be held on one day—Wednesday, October 19, at the Hotel Sherman. The regular

session will be preceded by a formal luncheon with a prominent executive of the gas industry as guest speaker. Three subjects of prime importance this year have been selected for the session following the luncheon. These are "Sales Techniques to Meet Tomorrow's Competition," "New Developments in Furnaceless Heating" and "Auxiliary Equipment for the All-Gas Commercial Kitchen."

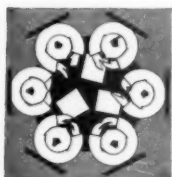
The Industrial and Commercial Section will be represented on the general sessions program by a speaker who will give an up-to-date report on findings of the commercial cooking equipment tests being conducted by A. G. A. This is a subject of vital interest to the gas industry and results of these tests should be helpful in meeting competition facing the industry in the commercial cooking field. An address by Frank H. Trembly, Jr., The Philadelphia Gas Works Co., will emphasize these findings.

On Wednesday afternoon at the Hotel Sherman, the A. G. A. Insurance Committee will conduct a conference for all members interested in this particular phase. It is expected that prominent insurance underwriting specialists will participate in a round-table discussion

covering various forms of insurance applicable to gas industry employees.

The Residential Gas Section will meet in the Grand Ballroom of the Sherman Hotel on Tuesday, October 18. Gas utilities now are well alerted to competitive conditions in a sellers' market. Co-ordinated industry programs for advertising, promotion, sales and sales training, such as the Court of Flame Campaign for automatic gas water heaters, The Old Stove Round-Up for automatic gas ranges, the Gas House Heating Contest sponsored by A. G. A. and Coroaire Heater Corp., and the Gas Summer Air Conditioning Contest sponsored by A. G. A. and Servel, Inc., are typical of the industry's efforts to maintain the conviction that Gas Has Got It. These programs will be reviewed and discussed at the Residential Gas Section meeting. The Section will also present a nationally-known speaker from the field of salesmanship on the general sessions program.

The Home Service Breakfast has won an enviable position in A. G. A. Convention programs, as attested by the hundreds of members who attended this annual event. (Continued on page 50)



Industrial relations round-table

Prepared by
A. G. A. Personnel Committee

● Bureau of Labor Statistics has just published another chapter for the revised edition of Bulletin 686, Union Agreement Provisions. The latest chapter deals with the subject of preamble, scope of bargaining unit, and duration of agreements.

● Compulsory arbitration of disputes involving public utilities under the New Jersey arbitration act, was declared unconstitutional in a recent decision by the New Jersey Supreme Court. This case was one brought by the Traffic Telephone Workers' Federation of New Jersey and the New Jersey Telephone Company against the State of New Jersey. The Court held that the Act, in delegating legislative authority to an administrative agency, in this case the boards of arbitration, failed to establish basic standards to guide the boards in exercising the power vested in them. The

omission in the law for compulsory arbitration of such criteria was the basis for declaring the Act unconstitutional.

● Office workers pay is the subject of a publication of the Bureau of Labor Statistics. It presents facts about salaries in 15 major cities, including New York, Philadelphia, Boston, Hartford, Cleveland, Chicago, St. Louis, Minneapolis-St. Paul, Atlanta, New Orleans, Richmond, Los Angeles, Seattle, and Portland, Oregon. Order from B. L. S., Washington 25, D. C.

● "Readability and Human Interest of House Organs" is the subject of an interesting survey recently completed by Donald G. Paterson and Bradley J. Walker of the Department of Psychology, University of Minnesota. Results of their survey are reported in the May 1949 issue of *Personnel* (American Management Association). In general their study indicates that of the house organs studied, the level of readability was too high for the rank and file while the human interest value of the contents was not

high enough to insure maximum reader interest. Their analyses of the sample house organs were made using Rudolph Flesch's new readability yardstick. A description of the Flesch yardstick can be found in the June 1948 issue of the *Journal of Applied Psychology* (copies may be obtained from American Psychological Association, Inc., 1515 Massachusetts Ave., N. W., Washington 5, D.C., for \$1.25).

● A Fair Employment Practices Act has been adopted in Rhode Island and will become effective July 1, 1949. The law provides that cases will be handled on the basis of private hearings. Publicity will be avoided until the cease and desist order stage is reached.

Oregon has also recently passed an anti-discrimination law which provides imprisonment and fines for violation.

A fair employment practices commission has been established in Philadelphia. Its five commissioners serve without pay. An employer sets his own standards for em-

(Continued on page 56)

*Person-to-person contacts play
an important role at conventions*

Get your money's worth



● The following article on how to attend a technical meeting, written by E. H. Rose, Tennessee Coal, Iron, and Railroad Company for members of American Institute of Mining and Metallurgical Engineers, applies equally well to members of American Gas Association. The author provides a new perspective of the value of "give and take" at such meetings. His ideas should be of interest to the thousands of gas men who are thinking of attending the A. G. A. convention in Chicago this fall.

From the more distant members and some not so distant, the complaint is often heard that they cannot justify the expense and time required to attend the annual meeting. Almost invariably, the reason given takes this form: "I just don't see that I would get enough out of it." Often the would-be clincher is added: "Besides, the meat of it all comes out in print anyway."

Not long ago, a group of us who have seldom missed a meeting in recent years fell to discussing this phenomenon, and found ourselves in emphatic agreement that anyone holding such a belief indicates by his first remark that he does not know how to attend a convention, and by his second, proves it. He is, by and large, the man who has never been there. Since he must often justify an expense account, these remarks are addressed to his employer as well, with the behest that prospecting for new techno-

logical knowledge or advances is like prospecting for ore or oil: the reconnaissance crews have to get out and look methodically, and in the right places, which are not necessarily "obvious" places.

This observer does not profess to be an expert in the matter, nor even a good journeyman instructor, but some compelling points may be ticked off by anyone who has had repeated exposure to the atmosphere of annual meetings.

(1) Information picked up in person-to-person contacts bulks far larger in take-home payoff than the official fare. Formal presentations necessarily are contributions to knowledge in the broad sense. They deal with the contributor's experience, not the listener's. They are a one-way conversation, so to speak. The listener takes no really active part, other than discussion from the floor and that only after the speaker has had his uninterrupted say.

But in the corridors, it's different. There and in the uninhibited informality of private rooms where kindred spirits gather, you find the source of the kind of information you came to get—the details too small or specialized to come out in the necessarily condensed formal sessions; latest on-the-scene accounts of experiments known to be in progress but not yet advanced enough for formal reporting; stories of experiments that failed and hence were not published to warn others away from the same blind alley, and innumerable straws in the wind to indicate the direction of technological progress to come.

There you do not take larger topics, one at a time, and exhaust them before passing on to the next. There you really get down to cases. I tell you how I am trying to do something; you come right back and tell me how you learned to do it better, and you make me a sketch.

Little stuff perhaps, but of good assay, and sometimes a real nugget turns up. If the fellow in the first paragraph insists upon measuring dollars to the disregard of satisfactions, he might calculate that one little item reduced to practice back home would pay for his annual trip to the meeting, even if he came from the other side of the continent. The "regulars" know that Lloyd's would make a neat profit by writing insurance to that general effect. It is, indeed, the reason those fellows show up year after year—without insurance other than their own convictions built up out of experience.

Nor is it all little stuff. I can cite chapter and verse on two major changes of practice in large plants that came about five years sooner than they otherwise would have, as the result of just such conversations in the byways of annual meetings—and no confidence violated in the process.

(2) Repeated attendance pays increasing dividends. Implicit in the foregoing is acquaintance with those persons of the most relevant interests. The degree of mutual benefit is measurable by the degree of mutual friendship, understanding, and respect. The standoffishness of strangers is fatal; the camaraderie of old friends, (Continued on page 55)



Pacific Coast new



Robert A. Hornby, Pacific Lighting Corp. and chairman, PAR Committee, addressing delegates, some of whom are shown in photo at top of page



Arthur F. Bridge, Southern Counties Gas Co. and chairman, A. G. A. Laboratories Managing Committee, presiding at luncheon on Thursday

Against a background of technical material presented by research men and other engineers, Pacific Coast gas men and manufacturers concentrated for two days last month on problems concerned with advancing the use of gas in the home and in improving the performance and reliability of domestic gas appliances. Meeting at the Ambassador Hotel in Los Angeles, May 26 and 27, over 220 persons attended and took part in the Pacific Coast Domestic Gas Research and Utilization Conference which was sponsored jointly by American Gas Association Committee on Domestic Gas Research and the Manufacturers Section of Pacific Coast Gas Association. Practical phases of research and utilization were incorporated in most of the papers and in all of the discussions.

Dr. Robert C. Weast, Case Institute of Technology, in his paper "Report on Developments in the Water Heating Research Program" pointed out that about 10,000 water heater tanks of all types fail each week as a result of corrosion. As a percentage of these are tanks of gas water heaters, he declared, the situation has become a problem for the gas industry as well as for the other industries concerned.

Dr. Weast pointed out the different kinds of corrosion and the different extent of corrosion that can be expected in localities where different types of water are supplied. By means of colored slides he showed the form corrosion takes in small experimental tanks for certain kinds of water. He also gave preliminary data on the series of corrosion tests he is running on full-size storage water heater tanks.

A trio of papers on completed, active and projected research in the three basic problems—venting, ignition and com-

bustion—that are of utmost importance in attaining optimum utilization of gas, were presented by Louis J. Kane, Earl J. Weber, and Walter B. Kirk, engineers at A. G. A. Testing Laboratories. Mr. Kirk is chief research engineer at the Laboratories.

All three men stressed the point that successful gas utilization revolves around ability as an industry to handle these three problems in a way that is entirely satisfactory to customers. Each of the three subjects was broken down into its technical components and the practical problems involved. Data and related information contained in recent research reports and bulletins on these subjects were analyzed, following which discussions were entered into by men of experience in the audience.

Edwin L. Hall, director, A. G. A. Testing Laboratories, presented a timely paper on What the Post-War Revision of A. G. A. Approval Requirements Means to Utility and Manufacturer Engineers. While most engineers in the industry have known that such revisions are under way, and some were familiar with changes in certain of the requirements, it was the first time that extent of the revisions and their significance had been clearly stated for the benefit of all engineers in the industry.

Certain questions have been raised regarding the effect on foods which are left standing in ovens for a number of hours prior to being cooked in automatic ovens. Dr. Gladys T. Stevenson, professor of home economics, Whittier College and a recognized food expert, presented the results of her work on this problem. She concluded that if properly handled, food contamination will not result from hours of standing in an oven. Her paper drew interested comment.

new domestic research results

Featured speaker at the Thursday Luncheon was Robert A. Hornby, vice-president, Pacific Lighting Corp., San Francisco and chairman, A. G. A. PAR Plan. Using slides and other illustrations, Mr. Hornby forcibly and clearly outlined the reasons for the PAR Plan, its objectives, its operation and its accomplishments. His talk provided the audience with a clearer understanding of the policy and business phases of this important industry movement in the promotion, advertising and research fields.

An analysis of the technical material contained in A. G. A. domestic research reports and bulletins, particularly those published this year, was made by William R. Teller, and C. C. Westmoreland.

Mr. Teller, who is director of research and development for Bryant Heater Division, Affiliated Gas Equipment, Inc., Cleveland showed by means of case histories how various manufacturer company engineering departments regularly use these bulletins in connection with appliance design and in improving appliance performance under various conditions of installation and operation. Mr. Westmoreland, who is supervisor of customer service training, Southern California Gas Co., Los Angeles, urged gas companies to use this material in training their installation and servicing personnel and others who are concerned with modern utilization of gas. He explained how his company is doing this to good advantage.

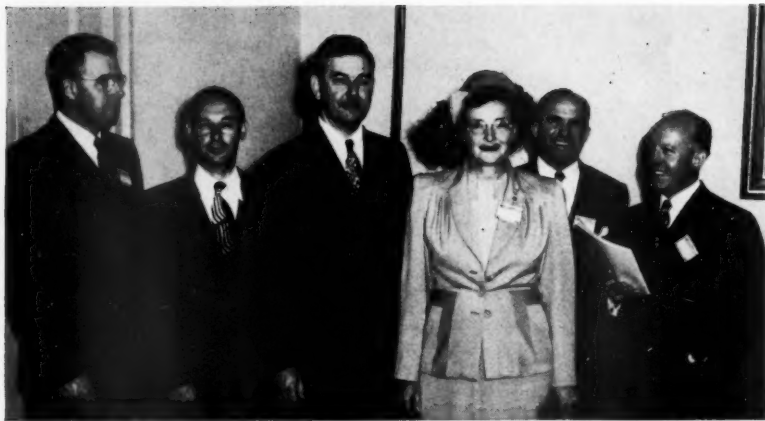
The important subject of effect of confined space installation on central gas space heating performance was analyzed by Walter B. Kirk, A. G. A. Testing Laboratories. New data on this subject was needed because trends in modern architecture have completely altered the spaces provided for the installation of



Discussing domestic research progress: (Left to right) T. T. Arden, Robertshaw-Fulton Controls Co.; W. H. Vogan, A. G. A. Testing Laboratories; Frank C. Packer, Affiliated Gas Equipment, Inc.; J. E. Kern, Pacific Coast Gas Association, and D. C. McLeary, Southern California Gas Company



J. E. Kern, Pacific Coast Gas Association (left); Guy Corfield, Southern California Gas Co.; Joe M. Allen and S. E. Cowan, Mountain Fuel Supply Co., Salt Lake City, Utah checking points on Pacific Coast conference program with Edwin L. Hall, director, A. G. A. Testing Laboratories



(Left to right) Guy Corfield, Southern California Gas Co.; S. G. Eskin, Robertshaw-Fulton Controls Co.; H. W. Geyer, Southern Counties Gas Co.; Dr. Gladys Stevenson, Whittier College, Whittier, Calif.; J. E. Kern, Pacific Coast Gas Association, and T. T. Arden, Robertshaw-Fulton Controls Company

furnaces, boilers and water heaters. Mr. Kirk explained reasons for projecting this research work during the coming year into its next phase—aeration of confined spaces where gas furnaces are installed.

F. O. Suffron, Hammel Radiator Engineering Corp., Los Angeles, a member of the Technical Advisory Group for Direct Space Heating Research, presented an illustrated paper entitled "Advanced Data on Venting Gas Appliances and Controlling Home Humidity" which had been prepared by Sam C. Hite, Purdue University. Of particular interest was Mr. Hite's description and analysis of wind tunnel tests on small models of houses at Purdue which, it is believed, showed graphically for the first time the locations and intensities of pressures and vacuums on the outside walls and roofs of houses that affect the venting of gas appliances.

The involved subject of public rules and ordinances that affect the use of gas,

was skillfully handled by H. W. Geyer, utilization engineer, Southern Counties Gas Company. He agreed with other experts that the ordinance situation is extremely confused and will become more confused if gas companies and appliance manufacturers do not follow the matter through with more vigor and understanding. He particularly showed what is necessary when a gas company serves a large number of cities, towns, and villages.

Following a discussion of projected A. G. A. utilization research led by Eugene D. Milener, A. G. A. coordinator of utilization research, the conference was concluded by a clinical discussion of technical subjects that are being investigated under the research program.

Mr. Milener opened the two-day proceedings with a foreword to the conference, and presided at the first session. Arthur F. Bridge, president, Pacific Coast Gas Association and president and general manager, Southern Counties Gas

Co., presided at the Thursday Luncheon and introduced Mr. Hornby. Other sessions were presided over by A. H. Sutton, president, Mission Appliance Corp., Los Angeles; Harry L. Masser, executive vice-president, Southern California Gas Co., and Thomas T. Arden, executive vice-president, Grayson Controls Division, Robertshaw-Fulton Controls Company. The Manufacturers Section of Pacific Coast Gas Association entertained the delegates Thursday evening.

The day previous to the opening of the conference, the newly expanded facilities of the Pacific Coast Branch, A. G. A. Testing Laboratories were inspected by the delegates and other guests.

The following papers, presented at the two A. G. A. research and utilization conferences held this year, can be obtained by members from A. G. A. headquarters in New York:

- J. French Robinson—"What the American Gas Association Research Program Means to You"
- H. Vinton Potter—"The Real Needs of Gas Appliances to Meet Customer Preferences"
- W. R. Teller—"How to Get the Most Use from Research Bulletins: Special Points for Manufacturers"
- Herbert Luoma—"Greater Use of A. G. A. Domestic Gas Research Bulletins by Gas Utility Men"
- C. George Segeler—"Public Rules and Ordinances Affecting the Use of Gas"
- Dr. Robert C. Weast—"Corrosion Research as Related to Hot Water Storage Tanks"
- Sam C. Hite—"Advance Data on Venting Gas Appliances and Controlling Home Humidity"
- Edwin L. Hall—"What the Postwar Revisions of A. G. A. Approval Requirements Mean to Utility and Manufacturer Engineers"
- Dr. G. T. Stevenson—"Automatic Clock-Controlled Oven Meal Research"
- C. C. Westmoreland—"How Utilities May

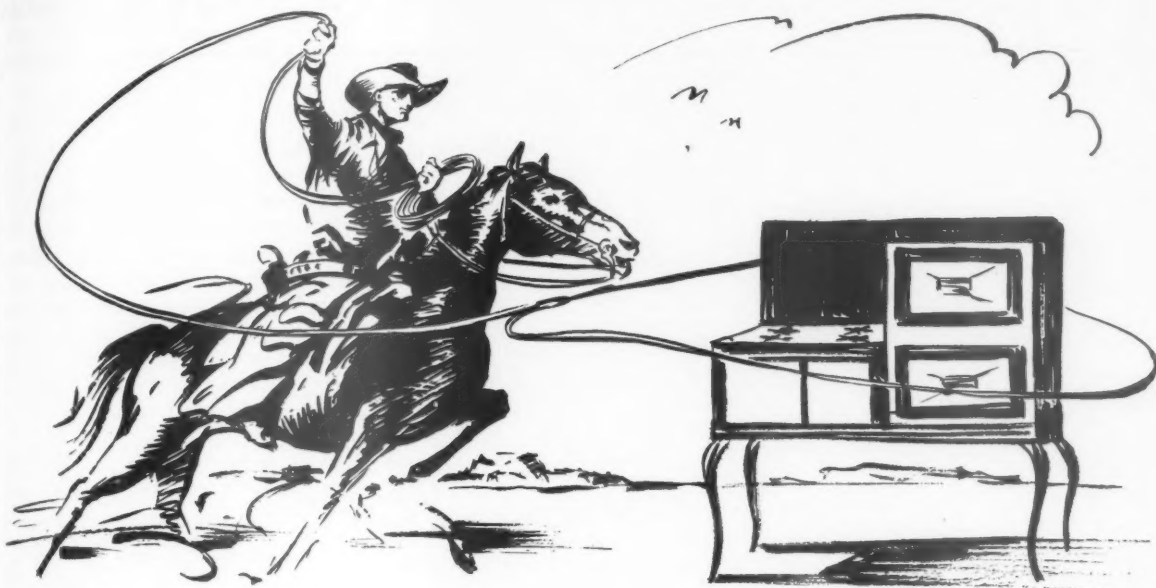
(Continued on page 48)



H. L. Masser (second from right) presiding at domestic gas research session. H. W. Geyer (left), Southern Counties Gas Co., W. R. Teller (second

from left), Affiliated Gas Equipment, Inc., and Dr. Robert C. Weast (right), Case Institute of Technology, delivering featured addresses at Los Angeles

Round-up those old stoves!



A PAR activity

Sales men dressed as cowboys will scour the country this fall to locate the oldest cooking appliance in every city and town and replace it with a new gas range, completely equipped with all the latest convenience and performance features. Gas utilities, 62 gas range manufacturers, and approximately 70,000 gas range dealers will launch the 1949 "Old Stove Round-Up."

Sponsored by American Gas Association with the cooperation of Gas Appliance Manufacturers Association and GAMA range division, this nation-wide promotion will mark the gas industry's return to all-out industry-wide sales campaigns to replace obsolete gas ranges with new models. The campaign was designed by A.G.A. Range Committee, Carl H. Horne, Alabama Gas Corp., chairman, and produced by A.G.A. Promotion Bureau.

All of the national advertising and sales promotion facilities of the industry will be coordinated in the program. Chief objective will be to point out to

present and future homemakers that they should not judge gas as a fuel for cooking or gas ranges as cooking devices by the ten, 15 and 25 year-old gas ranges now in use in many homes.

Nearly 50 percent of the 25,770,000 gas ranges in use are more than ten years old and 25 percent are more than 15 years old. Thousands of gas ranges in use were manufactured in the early 1900's.

Because gas range burners are guaranteed for the life of the range, the 20, 30 and 40-year old models now in use continue to provide cooking service but are not equipped with simmer type burners for waterless cooking and are not fully insulated or equipped with the automatic controls and other radical improvements in design, convenience and performance, which are found on new gas ranges today. The long life of gas ranges, which has made it unnecessary for consumers to shop for new appliances, frequently has resulted in lack of knowledge of the features of the new gas ranges and the advantages of modern gas cooking.

Spearhead of the campaign will be special national advertising copy of American Gas Association and individual manufacturers, pointing out to housewives that they should no more judge modern gas cooking by a 15 or 20-year-old gas range than they should judge a 1950 automobile by a 1935 model.

Tieing-in with this nation-wide campaign theme, many manufacturers are planning to build promotions around a nation-wide hunt for the oldest gas ranges in use bearing their individual brand name.

Special portfolios describing and explaining the drive will be ready for delivery around August 15 so that companies which want to start off in late August or early September will be well prepared. The dealer portfolio will be, in effect, a plan book telling how to organize and operate an effective old-stove round-up campaign. Manufacturers will be able to use the portfolio as the basis of their individual company campaigns.

Each manu- (Continued on page 29)

Storage of propane gas to meet peak load

By A. B. LAUDERBAUGH

*Chief Gas Engineer
The Manufacturers Light
and Heat Co., Pittsburgh, Pa.*

Use of liquefied petroleum gas as a standby fuel, or to meet winter-time peak loads, is no longer in the experimental stage. As recently as three years ago, any discussion of propane-air plants had to begin with a definition or description of propane. This was then followed by a parade of evidence to prove that propane-air gas was interchangeable with, and could be used as a substitute for, either natural gas or manufactured gas. Since that time, many plants have been constructed, and millions of gallons of propane have been used as a substitute for natural gas or manufactured gas. It is therefore assumed that the general physical properties of propane are known and it is accepted as a fact that propane-air can be made interchangeable with either natural or manufactured gas.

Almost without exception, gas companies of the Appalachian area, or for that matter of the entire country, have within the last four years come face to face with an unprecedented winter peak-load problem. Much of this problem is undoubtedly due to the fact that because the rate structures of gas companies are subject to regulation, they have not advanced with the prices of competitive fuels; consequently gas is sometimes a cheaper fuel than oil, anthracite coal or even bituminous coal. The net result is that the gas companies have a much greater

winter-time domestic load than ever before, and system load factors have declined.

Winter-time loads have always varied with the weather, but never before were the variations so severe. In the Appalachian area, depletion of local fields further complicates the problem by requiring that more and more gas be obtained through long-distance pipe-lines. If we stop to think that 100 million cubic feet of natural gas weighs 2,500 tons; that to be of use in Pittsburgh, it must be pumped about 1,500 miles from the gas fields of the Southwest; that at best, we would have only about three-days reliable advance weather warning in which to complete the three and three-quarter million ton-miles of transportation required to get that 100 million cubic feet where we want it, we can better understand the physical improbability of meeting the peak problem with long line facilities.

Entirely separate from the physical problem of meeting this peak load with pipeline gas is the economic side of the consideration. Most pipeline gas is now sold at a demand-commodity rate. Such rates put a severe economic penalty on purchases at even a 0.75 load factor, and are prohibitive at the factors now developed by the domestic heating load.

Delivery into a system of bulk volumes of gas for winter-time use is not the only factor in solving this peak-load problem. In the past, many natural gas companies have had a few communities with a high saturation of gas heating, but never before have so many communities wanted so much gas for house heating. The problem has become one of placement as well as procurement. Distribution systems, intermediate pressure systems, and the interconnecting transmission networks are, in many cases, extended to their

limit of capacity.

All of these factors complicate the solution of the problem, but these and other factors must be given consideration in the design of a plant or plants to meet the peak-load demand. Admittedly, peak load gas is always expensive gas, particularly so when you do not have it.

Calling attention to its high cost usually stops any tendency to try to use propane-air gas as "firm gas." In the Pittsburgh area, for example, the raw material required to make propane-air gas as a replacement for one Mcf of natural gas will currently cost about \$1.10. If the domestic rate for natural gas is fifty cents per Mcf, there is never any strong incentive to make large quantities of propane-air gas at a total cost of at least \$1.40 and sell it for 35 percent of what it cost to make it.

Purpose changes

The original purpose or necessity for the construction and operation of some propane-air plants has undergone a startling metamorphosis. Many of the first plants erected on natural gas systems were constructed as insurance against failure of the natural gas supply. Particularly was this true of those propane-air plants built and operated by industrial users of natural gas. In their case, the cost of construction and operation of the propane-air plant had to be justified by losses sustained through "shut-down" when their supply of natural gas was curtailed.

The first large expansion in the construction of propane-air plants came as a result of the recent war. Industrial plants holding war contracts were bluntly told to install standby fuel systems so that there would be no shut-down, of even as little as a day, through failure of the normal gas supply. It was a war economy, cost was of

Presented at Spring Meeting, Natural Gas Department, American Gas Association, French Lick, Indiana, May 9-10, 1949.

ea loads

no moment, and plants, large and small, were built and operated.

After the war, the general demand for gas continued to increase. Natural gas companies, in particular, were hard-pressed to meet the demand. It requires considerable time to increase the amount of gas transported by long pipeline. Propane-air plants presented a possibility of bridging the time gap necessary to secure greater volumes from the Southwest and to construct the interconnecting transmission networks required to distribute this increased volume. Because propane-air plants were the cheapest stop-gap for this situation, many were constructed. Among them were those of my company. These plants performed yeoman service during the winters of 1946-47 and 1947-48.

For the Appalachian area, at least, the winter of 1948-49 was the mildest on record, and there was little or no necessity to operate propane-air plants. Since 1947, the expansion of long line facilities from the Southwest and the construction of additional lines in the local transmission networks have made more gas available for markets, and again the reasons for the construction, maintenance and operation of propane-air plants have changed.

For many years, the natural gas industry has used a commodity rate for the purchase and sale of gas. To make construction of long line facilities economically feasible it was necessary to add a demand factor to the rate structure. Most of these demand rates are based on the maximum quantity delivered in one day during the preceding 12 months. There are then two items on the monthly invoice, one, a flat charge per Mcf for the gas de-



Propane loading yard shown at right. Photograph by Badger, Standard Oil Company of New Jersey

Who profits from American business?

● Many of the objections to our present system are based on fallacies. Let us examine a few of them. For half a century, soap-box orators, wily subversives, and well-meaning but misled reformers have spread the completely erroneous idea that workers get the smallest share of the income which manufacturing produces and that the owners receive fabulous amounts. Actually, out of every dollar of sales made by a manufacturer, 47 cents go for materials and supplies, of which 35 to 45 cents go to the workers who produce those materials. Nine cents go for taxes of which four cents are paid to government employees. Six cents go for depreciation, maintenance, repairs, and interests; two cents for advertising, and one cent for research. That leaves 35 cents from the sales dollar of which the employees get 29 cents. The remaining six cents are profit of which three cents are set aside for tomorrow's jobs by reserves to buy new machines and to expand plants. The remaining three cents are paid to stockholders, who are the owners of the machines, the tools, and the factory buildings.

"All told, approximately 85 cents out of every dollar of sales by manufacturers go for salaries and wages.

"Stymied in that argument, the critics then turn their guns on the three cents that go to the owners. They give the impression that American business is owned by a mere handful of individuals. Here again, they must face the facts. Actually, some 14 million people own shares in American industry; workmen, teachers, grocers, bus drivers, and many others who have saved and invested their money. These securities are much like promissory notes; receipts, if you will, for the money which the firms borrowed from these individuals and on which they attempt to pay interest in the form of dividends.

"In addition to these direct owners of American business, there are 54 million who have life insurance policies, and 50 million who have savings accounts. All of these people are vitally interested in the successful operations and profits of American business because the insurance companies and banks in which they have deposited their money have, in turn, reinvested most of these funds in securities of American business.

"Thus, it is apparent that the vast majority of our population receives direct or indirect benefits from American business.—Harvey S. Firestone, Jr., president, Firestone Tire & Rubber Company.

livered that month, and the other a charge of so much per M for the maximum volume delivered on one day during the preceding twelve months.

It becomes quite obvious that, without peak shaving, the volume used on the maximum winter day will be used to calculate a part of each monthly bill for the next 12 months, and that by peak shaving substantial savings are possible. Per dollar demand charge per Mcf, each million cubic feet shaved from the peak day will then represent a gross reduction of \$12,000 in the annual cost of gas.

Just how much of the peak load of any company can be furnished by propane-air will be a function of the physical structure of the property, the individual load characteristics of the company, and the purchase and sales rates for gas. During a normal winter in the Appalachian area there will be an average of 15 days when the total domestic demand for gas will be within ten percent of the demand on the maximum day. It is on these ten to 20 days that peak shaving with propane-air can be used to best advantage.

It is a generally accepted opinion

that most natural gas companies cannot afford to make more than two percent of their total annual sales in propane-air gas. There are, of course, notable exceptions to this general statement and every contemplated installation must be given individual consideration; but for most companies, two percent will still be the top limiting figure.

Since propane-air is expensive and should not be used with a lavish hand, let us now consider some of its advantages for use in reasonable quantities. First of all, it is interchangeable with natural or manufactured gas in any proportion, including 100 percent substitution. It can be sent out at any pressure up to about 125 Psig during 100 percent replacement, and up to 350 Psig if it is mixed about 50-50 with natural gas. Therefore, the plant or plants can be placed almost anywhere in the system and be designed to match the pressure on the line at that location.

A propane-air plant can be placed close to the point of demand and thereby help to solve the ton-mile transportation problem on the peak

days when pipeline facilities may be extended to their limit. Unlike some other types of peak shaving plants, a propane-air plant can be started up and shut down quickly, making it ideal for use on the peak hours of a number of days during the winter season. If it is electrically operated, it can actually be made to operate on push button control. Whether electric or gas engine driven compressors are used, a five or even a seven million a day plant can be operated with one man per shift. Its ratio of effective output volume to storage volume is about 700 to one, that is to say, that for every cubic foot of liquid in storage, there will be more than 500 cubic feet of plant output gas, and this output gas will replace or be equivalent to 700 cubic feet of 1,100 Btu natural gas.

Propane-air plants can be constructed with almost any desired maximum send out capacity, from less than half a million a day to more than 50 million a day. Even more important is the fact that regardless of the maximum rate of the plant, it can be designed to have a satisfactory, stepless turn-down of at least ten to one. In other words, a plant designed to have a maximum operating rate of, say, five million cubic feet per day can be operated to send out any volume between five million per day and a half million per day. All of these are the more important factors that have influenced both natural and manufactured gas companies to install propane-air plants to assist them in meeting the winter time peak loads.

Quite naturally, the next questions are about sizing and cost and, frankly, they are difficult to answer. Obviously, the maximum capacity of the plant will be controlled by the amount it is desired to "shave" the peak day, and the amount of storage at the plant, by the probable number of days in a normal winter when the system demand will be a figure between the maximum demand and the maximum demand less the capacity of the propane-air plant.

The size of the plant may also depend upon whether there is pipeline capacity to transport the propane-air gas from one plant to several towns or cities, or whether each city or town must have its own plant. In general, plants with a (Continued on page 49)

Meeting combustion problems

By J. J. TURIN¹
J. HUEBLER

Professor of Physics, University of Toledo; Research Engineer, Surface Combustion Corporation Laboratory, Respectively

A PAR activity General interest in rapid heating has placed emphasis upon the combustion problems associated with increasing the rate of heat energy released in a given space. Combustion problems associated with increasing the amount of heat energy liberated per unit of time have become of greater and greater interest to industrial gas men.

Accelerated combustion means higher available flame temperatures and implies more rapid heating with gas fuel. Industrially speaking, it is of major importance to be able to heat rapidly whether the items are being heated in a furnace or by direct flame impingement.

For the most part, at the present time, wherever combustion is utilized industrially, the limitation on the maximum temperature used is primarily set either by the mixture being burned or by the refractory limitations and insulating characteristics of the material used to confine the heat. Refractory developments are proceeding, however, and conceivably could outstrip the combustion engineer's ability to cause the fuel to burn at sufficiently high velocities. Thus, the great interest in rapid heating forces us to look in the direction of more rapid combustion with the possible goals of multiplying the energy release per unit of volume

and unit of time as well as increasing effective or usable flame temperature.

From this standpoint, it is important to understand the combustion reactions as well as possible so that the characteristics of the flame may be predicted and controlled for any given application. With this in mind, the American Gas Association Committee on Industrial and Commercial Gas Research has always been interested in sponsoring research to advance the fundamentals of combustion phenomena.

Although the normal velocity of flame propagation is well known for most mixtures of fuel and air under ordinary conditions, from the standpoint of a theoretical understanding of the combustion phenomena it is difficult to determine exactly how or why this velocity is obtained. One of the present major interests is to understand the conditions under which detonation occurs, because the fact is

known that under conditions of detonation the velocity of flame propagation reaches values more than 1,000 times as great as normal flame propagation. This problem is being studied under the sponsorship of American Gas Association at Surface Combustion Corporation Laboratory, as Industrial Research Project I.G.R.-59, "Advanced Studies in Combustion of Industrial Gas"—a PAR Plan Activity.

Always accompanying such an investigation is the inevitable search for literature in that field so that the investigator can gain a picture of what has been done previously and build upon the foundation of understanding already established. The study of combustion literature, of necessity must include problems in combustion encountered in the field of jet engines utilized for thrust or propulsion and must compare those problems with the problem of utilizing combustion for attain-



Authors J. J. Turin (left) and J. Huebler discuss the fundamental purpose of combustion processes

¹ Also consultant for Surface Combustion Corporation Laboratory.

Jet engine combustion study shows similarity of problems with those found in industrial gas turbines

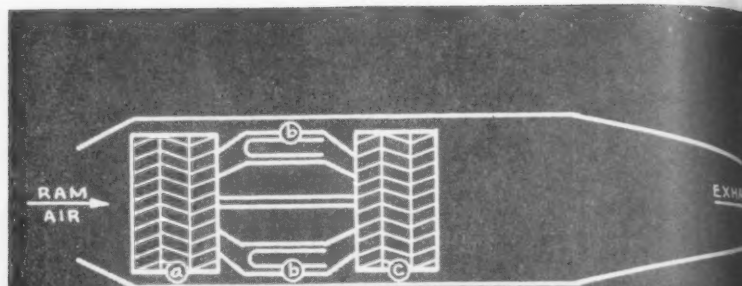


FIG. 1
A. COMPRESSOR B. COMBUSTORS C. TURBINE
SCHEMATIC SKETCH OF TURBO-JET ENGINE

ing high temperatures. The objective in this case was to discover by studying the propulsion problems and their modes of solution whether the techniques employed contribute to a further understanding of the fundamental combustion processes involved.

With one exception, the fundamental combustion problem in propulsion is quite different due to the fact that the end use or purpose of the combustion has little in common with most industrial applications. The exception lies in the field of industrial gas turbines where the combustion problems encountered are quite similar to the problems in jet engines.

In view of the fact that the study of combustion in propulsion devices is a necessary part of the combustion studies undertaken in the present program and because of the great prominence that gas turbines and jet combustion devices have displayed in recent years, it appears worthwhile to try to make available in a more or less non-technical way the results of the studies as they compare to the ordinary types of combustion problems encountered by the industrial gas engineer. The present article is directed towards familiarizing the industrial combustion engineer with problems normally encountered by the propulsion combustion engineer.

It is well known that the internal combustion engine has had a long life and a great application in modern civil-

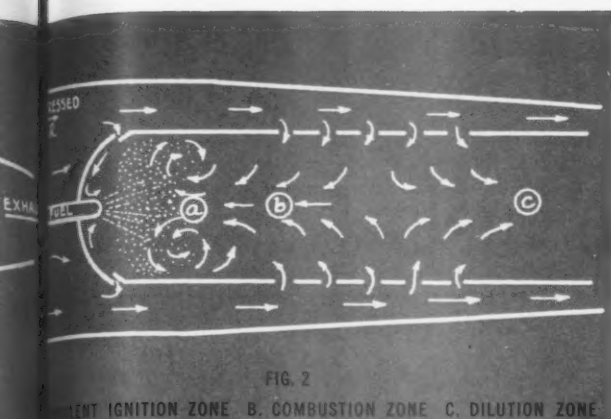
ization and is certain to enjoy a greatly prolonged existence. This is particularly true where the engine is applied to immobile power plants, for ground transportation and low speed aircraft. In these cases power and efficiency are the major considerations while velocity requirements are comparatively negligible. However, in the field of aircraft propulsion there is tremendous military emphasis upon extremely high velocities. The highest velocity is always too slow, and there is always feverish activity in the development of aircraft to fly at higher and higher velocities. At one time the speed of sound seemed fast, the barrier to speeds above the velocity of sound seemed impossible to surmount, but now even this has been surpassed. Present activity is directed towards aircraft which will fly not only faster than the velocity of sound but many times as fast.

It is profitable to examine the reason for limitation of the internal combustion engine in the range of velocities of aircraft flight as they approach the velocity of sound. In this way one can understand the necessity for introduction of jet engines, the nature of the limitations of the combustion problems involved with jet engines and the basis upon which they must be solved.

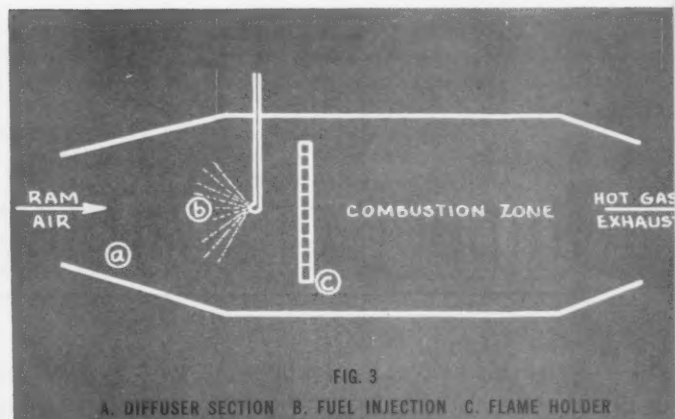
Generally speaking, the internal combustion engine on an aircraft turns a propeller, which like a corkscrew digs itself into the air and moves over

the surface of the aircraft a large amount of air giving that air an acceleration. The thrust which the airplane actually receives is the time rate of change of the momentum of the air moved past the airplane. In other words, the thrust is given by the product of the mass of air moved and the acceleration of that mass of air. The acceleration that the air receives is proportional to the difference between the velocity of air entering the propeller and that exiting from the propeller.

The internal combustion engine derives thrust by moving an extremely large amount of air with its propeller but imparting to this air only a small increment in velocity. The efficiency in regard to the thrust of such an engine is quite satisfactory inasmuch as the power holds almost constant as a function of the velocity of the aircraft itself; that is, it holds almost constant providing the speed of the aircraft does not approach the velocity of sound. In order for the plane to approach the velocity of sound the tip speeds of the propellers approach sonic velocities and their efficiency drops off rather rapidly. Because it is not known at present how to design propellers to eliminate this difficulty, the power drops off quite rapidly as the velocity of the plane approaches the velocity of sound. Consequently, the propeller-driven aircraft cannot at present surmount the sonic velocity barrier.



SCHEMATIC SKETCH OF COMBUSTOR



SCHEMATIC SKETCH OF RAM-JET ENGINE

It is possible that this difficulty will be eliminated when sufficient knowledge is obtained concerning the design of propellers for this zone of transition.

If we examine again the mechanism by which the propeller produces thrust, we find that an extremely large amount of air is given a relatively small acceleration. It would appear possible to get the same thrust by moving a much smaller amount of air but giving it a much greater acceleration. This means, of course, that the thrust will be obtained by increasing the difference between the inlet and exit velocity of air to the engine far in excess of what is normally done in a propeller type engine. This is where the jet engine comes into the picture.

Turbo jet engine

The fundamental basis on which the turbo jet engine operates, therefore, is to impart an extremely large velocity difference to a relatively small mass of air. This is accomplished by taking in a volume of cold air at the front, heating it to about 1500° F and exhausting it at the rear. This temperature change caused the volume of the air to be increased fourfold. As a consequence, if the entrance and exit ports have the same area, the velocity of the air will be increased by a factor of four. The fundamental problem, therefore, is the manner of heating a mass of air from ambient temperature up to approxi-

mately 1500° F by a combustion process.

Elements of the turbo jet engine consist of a compressor, combustor and gas turbine as shown in Figure 1. Prime importance is given to lightness and compactness of these elements. A portion of the compressed air from the compressor is mixed with fuel and burned in the combustion chamber. The flue gases are diluted with an additional portion of the compressed air to lower the temperature to a usable value, 1500° F being the present upper limit. At this point a great deal of energy has been stored in the hot, compressed air.

Since motive power must be furnished for the compressor the best means from a standpoint of weight, simplicity and efficiency, is to drive a turbine which is directly coupled to the compressor. The turbine uses the bulk of the stored energy, and the remainder of the energy is used to provide thrust by expanding the air through the tail pipe. Thus, the necessary energy for compression is derived from the turbine, and the combustion energy is transformed into thrust by expansion of the air (except for inefficiencies) at a velocity greatly in excess of the intake air velocity. Thus, a great premium is placed upon the most efficient design of compressors and turbines for these purposes. This is the heart of the turbo jet engine as the name implies.

What are the combustion problems involved here? It is apparent that the

higher the temperature of the exiting gases the greater will be the developed thrust. On the other hand, the exit gases must pass through the turbine or the whole scheme is inoperable. A turbine operates at a high rotational velocity, and the blades of the turbine wheel must be able to withstand the stresses developed at these high velocities of rotation. Unfortunately, even the best materials at present are not good enough to withstand temperatures much in excess of 1500° F under such conditions of service. For this reason, there is no immediate desire to obtain higher flame temperatures.

On the contrary, the present desire would be to maintain continuous flame in mixtures of such leanness as to give a flame temperature of the order of 1500° F. Present space and weight requirements cause the combustion engineer to design for intense combustion at nearly stoichiometric mixtures followed by immediate and efficient dilution with cold air to the desired temperature. Since combustion virtually ceases when the dilution air is added, combustion must be completed before that time or a loss in efficiency will be experienced.

The situation is further complicated by the necessary conditions that the combustion must be maintained and kept smooth under rapidly changing conditions due to acceleration, deceleration and altitude variations. Hot spots and carbon (Continued on page 51)

Impact of synthetic fuels

Much has been said and written in recent months concerning the probable future of synthetic fuels in America. At present³ the consensus of opinion seems to be that synthetic production will be required to supplement domestic production either for security reasons or economic reasons within the next decade or two. Opinions vary widely as to the time, place and type of process for the first synthetic oil production from coal (synthetic oil from natural gas will be neglected in this article, except for its effect on supply and price of natural gas).

The major part of the work on pro-

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P. W. LAUGHREY,¹
L. C. SKINNER,¹
H. R. BATCHELDER¹
E. E. DONATH²

duction of synthetic liquid fuels today is confined to three types of processes. The first is the retorting of oil shale, which potentially can yield large amounts of shale oil as a substitute for petroleum but which should have little or no effect on the gas industry since any excess gas

produced will be used as fuel or for the production of power. The fact that the richest and most extensive shale deposits occur in regions quite remote from any large population centers would greatly decrease the usefulness of any excess fuel gas that might be produced.

The second process is gasification of coal with steam and oxygen or air and conversion of the resulting synthesis gas to liquid products by the Fischer-Tropsch synthesis. This process produces appreciable quantities of residual gas from which can be separated a high-Btu fuel gas suitable as a general substitute for

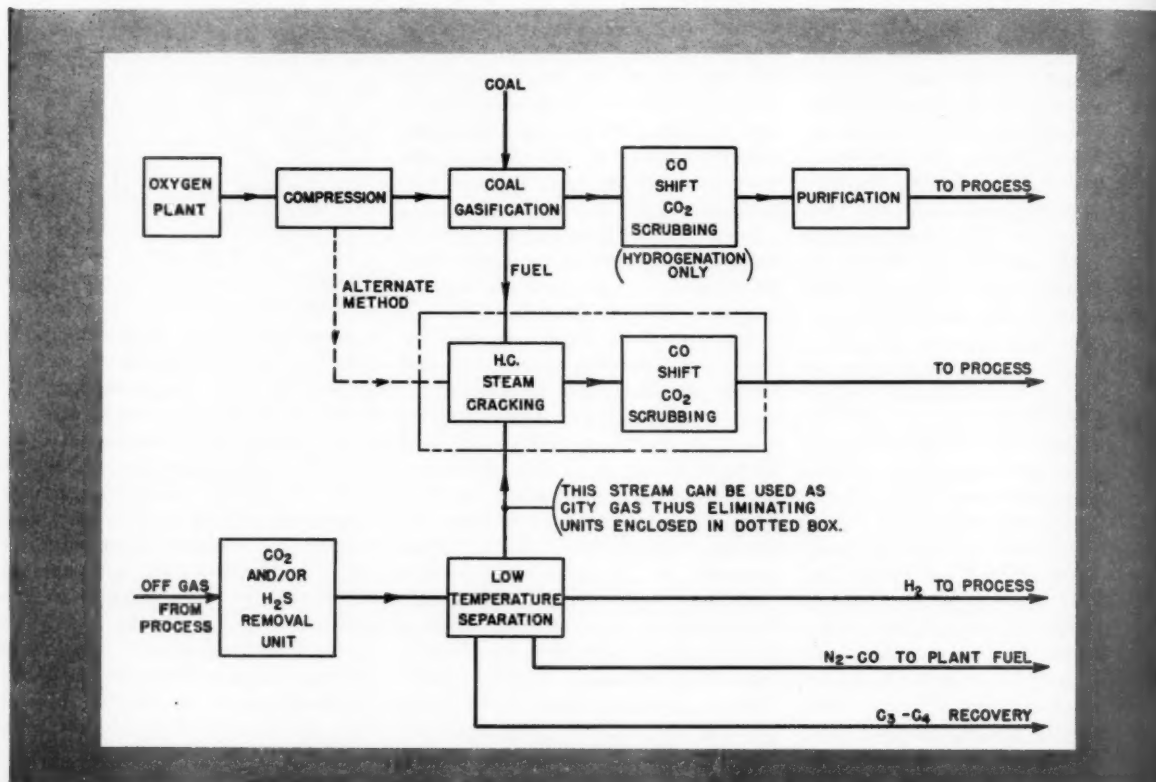


Figure 1. Flow sheet of combined gas-production facilities for a synthetic-fuel plant, typical for both hydrogenation and Fischer-Tropsch processes

natural gas or as a supplement to present manufactured gas production. It is anticipated that a reasonable proportion of any future synthetic-fuel production by this process would be located close enough to centers of population so that the gas could be economically transported to the various cities.

The third process under investigation is the coal-hydrogenation process which also yields a residual gas that can be made available in a form suitable for general use. As in the case of the Fischer-Tropsch, it is expected that a fair proportion of these future plants would be established in areas where the gas could be used.

In both the Fischer-Tropsch and coal-hydrogenation processes, the gas required for the main process must be obtained from gasification of coal. The coal-gasification step probably can be so controlled as to produce a synthesis gas of the composition that can be used directly in the synthesis step. In the case of the coal-hydrogenation process, it will be necessary to carry out a gas-water-shift step by which the carbon monoxide in the original gas is converted to carbon dioxide with the production of more hydrogen. Some of the necessary hydrogen gas can be obtained by reforming the light hydrocarbons in the tail gas from each process and thus decrease the coal-gasification requirements. This is not essential, however, and the high-Btu fraction of this tail gas represents a potential replacement of or supplement to natural-gas-supplies.

Particularly in the East, the problem of supplying the potential demand for gas has been made more difficult by the limitations of the local distribution systems, which represent such a large part of the investment of a gas company. In an increasing number of instances, this difficulty has been met by increasing the heating value of the send-out gas so that the same number of cubic feet distributed supplies a greatly increased load. New supplies of gas of low heating value would not alleviate the shortage due to this quality specification for the

supply, and to be most generally useful the new sources must be of high heating value comparable to that of the present natural gas.

With natural gas continuing to be available through the foreseeable future in adequate quantities, it still could be expected that the price at the well or collecting station would increase along with the demand and with the development of non-fuel uses, such as chemicals production and the like.

With the existing system of pipelines for transmitting natural gas and the probability of a decreased supply of gas to be transmitted, it seems reasonable to assume that a fair proportion of any synthetic-fuel production will develop within a moderate distance from some of these transmission lines, particularly if the coals of West Virginia, Kentucky and Pennsylvania are used. We have, then, the possibility of producing considerable amounts of high-Btu gas at points on or adjacent to an existing natural-gas transmission system.

Some gaseous hydrocarbons are formed in all synthetic-fuel processes. In general, they can be utilized in the process either as plant fuel or to supplement the raw coal entering the process, thus reducing the outside raw material requirements per unit of product. It is possible, however, to make almost the entire output of these gaseous hydrocarbons available for use outside the plant, provided economic conditions warrant such a disposition. It is also possible to increase the production of such materials appreciably above the normal rate, if necessary, without jeopardizing normal liquid fuel output. The following information on the two most promising synthetic fuel processes will illustrate the effect of such an operation.

In the coal-hydrogenation process coal is liquefied directly by reacting it with hydrogen under suitable conditions of temperature and pressure in the presence of a catalyst. The coal is first pulverized and mixed with an approximately equal weight of heavy oil from the process and a small percentage of catalyst. The paste so formed is pumped, with hydrogen, through preheaters into a series of high-pressure vessels.

Pressure is maintained at 3,000 to 10,000 pounds per square inch, and temperatures are controlled at 800° to 900° F. Lighter products of the reaction are separated and hydrogenated further in

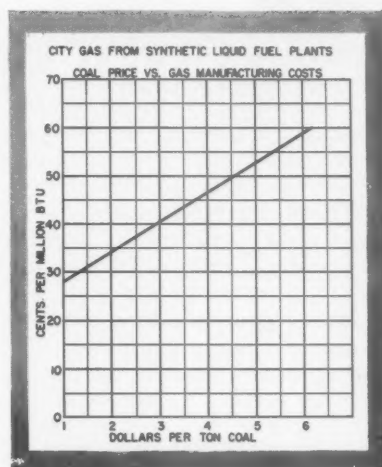


Figure 2. Chart of cost figures computed on the basis of an incremental increase of the entire plant operation due to changed conditions

a vapor-phase operation, while the heavy oils are recycled. The ash and non-liquefied portions of the coal are continuously removed from a portion of the recycle oil. Recycling of the heavy oil and vapor-phase hydrogenation of the light oils permit conversion of all the liquefied coal to gasoline and lighter products, although the process also can be operated to produce chiefly heavy fuel oil or Diesel oil. Some methane and ethane are formed, but are used to provide part of the hydrogen for the process.

The hydrocarbon gases suitable for city gas, produced in normal operation of a 10,000 barrel-per-day coal-hydrogenation plant manufacturing gasoline and LP-gas, will amount to about 390,000 standard cubic feet per hour with a net heating value of 1,065 Btu/SCF, or 10.0 billion Btu per day. This gas, if not sold, would be used to produce hydrogen for the process in a hydrocarbon steam-reforming operation. Approximately 50 percent of the total hydrogen requirements for the plant can be produced from these gases, the balance being made by direct gasification of coal or recovered from tail gases in a low-temperature separation unit. Figure 1 is a flow sheet of combined gas-production facilities for a synthetic-fuel plant. This flow sheet is typical for both hydrogenation and Fischer-Tropsch processes.

One way to make this hydrocarbon gas stream available for outside sale and consumption would be by eliminating the hydrocarbon steam-reforming section and increasing the size of the coal-gasifi-

Presented at A. G. A. Production and Chemical Conference in New York, N. Y., May 23-25, 1949.

¹ Chemical engineer, coal-to-oil demonstration branch, Office of Synthetic Liquid Fuels, U. S. Department of the Interior, Bureau of Mines, Louisiana, Missouri.

² Scientific consultant, Quartermaster Corps, Department of the Army, formerly chief chemist for research, hydrogenation department, I. G. Farbenindustrie, Ludwigshafen (Rhein).

³ Work on manuscript completed March 25, 1949.

cation section, including all necessary auxiliaries, to such a point that it could produce an equivalent amount of hydrogen. This substitution would: (a) Increase the investment cost of the plant; (b) increase power requirements; (c) increase coal requirements, and (d) reduce steam consumption slightly.

Evaluating the magnitude of these effects, in our current cost estimates for a 30,000-barrel-per-day coal-hydrogenation plant,⁴ about \$14 million additional investment is required, including utilities production, distribution, and all general plant facilities, for a daily production of 30×10^9 Btu, or roughly \$500 per million Btu daily capacity. A thermal efficiency of 68 percent is indicated, based on net heating value of the gas versus net heating value of additional coal required. These cost figures apply to a plant built specifically for producing city gas as a by-product. If the hydrocarbon steam-reforming section were in existence a larger investment would be required to make the alteration.

Based on data obtained in the above calculation and using coal at \$3.56 per ton, the cost or actual value of this gas, without profit, is \$0.44 per million Btu, made up as follows:

⁴ An estimate of plant and operating cost for the production of gasoline by the hydrogenation of coal, by L. L. Hirst and others, now in manuscript form, will be published as Bureau of Mines Report of Investigations.

Cost per million Btu	
Coal at \$3.56 per ton	\$0.22
Others direct costs (labor, maintenance, supplies)	.08
Indirect costs (overhead and indirect operating costs)	.04
Fixed costs (includes taxes and amortization)	.10
	<u>\$.44</u>

Figure 2 shows similar costs for various prices of coal.

The preceding table should not be taken too literally, since it does not represent actual operation of a specific unit but rather an incremental increase of the entire plant operation due to changed conditions. Amortization in 15 years, three percent maintenance, and labor at \$1.75 per hour were used in obtaining the cost figures.

Conditions and properties of gas produced by hydrogenation would be about:

Pressure at delivery point (plant site)	
350 psi	
Sulfur content below ten grains/100 SCF	
Density	0.7 (air = 1)
Composition	Percent
Hydrogen (H ₂)	8
Methane (C ₁)	57
Ethane (C ₂)	28
Propane (C ₃)	3
Carbon monoxide (CO)	2
Inerts	2

In the gas-synthesis or modified Fischer-Tropsch process, the coal first is gasified to produce synthesis gas—a mixture of carbon monoxide and hydrogen. This gas is then purified and passed over a catalyst under suitable conditions of temperature and pressure. The carbon monoxide and hydrogen combine to form chiefly liquid hydrocarbons, with smaller percentages of oxygenated compounds and gases. Products vary over a wide range from solid wax to methane, the relative quantities depending on the catalyst employed and the conditions of temperature and pressure.

Preliminary calculations have indicated that there may be recovered from the residual gas of the Fischer-Tropsch process a high-Btu gas of substantially the same composition and quantity as that recovered from the coal-hydrogenation unit per barrel of oil produced. Since the same substitution of coal-gasification capacity and the same elimination of a steam-reforming unit will be involved, it is anticipated that the value of this gas will roughly equal that recovered from coal hydrogenation.

Where special local conditions would make it desirable, it would be possible to produce a larger amount of lower-heating-value gas by eliminating the low-temperature separation unit. This would include, then, in the fuel gas to be sold outside, the unreacted hydrogen and carbon monoxide as well as the nitrogen from the first pass through the synthesis step. From one to 10,000-barrel-per-day plant, this gas would amount to about one million standard cubic feet per hour, with the heating value of approximately 650 Btu. This then would make available 50 percent more fuel; but because of its low heating value, it probably would not be suitable for long-distance pipeline transmission or even for local distribution in a good many instances. The composition of this gas would be as indicated below:

Pressure at delivery point (plant site)	
350 psi	
Sulfur content—0	
Density—0.67 (air=1.0)	
Composition	

	Percent
Hydrogen (H ₂)	23
Methane (C ₁)	28
Ethane (C ₂)	15
Propane (C ₃)	2
Carbon monoxide (CO)	23
Inerts	9

(Continued on page 24)

1949-1950 advertising plans developed



Members of A. G. A. National Advertising Committee meeting in New York City on June 9 to plan 15-month program of national advertising for the period, October 1, 1949-December 31, 1950. (Left to right seated) J. C. Sackman, Hammond, Ind.; W. B. Hewson, Brooklyn, N. Y.; Christy Payne, Jr., Pittsburgh, Pa.; C. L. May, Dallas, Texas, and J. P. Leinroth, Newark, N. J.; (standing) F. T. Rainey, Columbus, Ohio; J. J. Quinn, Boston, Mass., chairman; C. G. Cassidy, Chicago, Ill.; Harold Massey, GAMA; H. Vinton Potter, A. G. A.; C. W. Person, A. G. A., committee secretary

Make your dealer an appliance merchant

By HAROLD W. SPRINGBORN

Managing Editor

Gas Age, New York, N. Y.

The fundamental idea behind dealer co-operation is 30 years old. In 1919 an American Gas Association subcommittee reported various efforts to cooperate with architects, contractors and builders. As early as 1923, there are records of plans for more sales of appliances by dealers. In 1926, efforts were made to form a joint committee of American Gas Association, National Association of Master Plumbers, and Heating and Piping Contractors Association.

Two years later, in 1928, Oscar Fogg, then president of A. G. A. and vice-president, Consolidated Gas Company of New York, presented before New England Gas Association a thought-provoking address on "Sales Allies." He warned gas men that residential load was showing a slow rate of growth, that there were many unprofitable customers on the lines, and he declared "we are faced with a dearth of sales outlets."

Presented before A. G. A. New York-New Jersey Regional Gas Sales Conference in Spring Lake, N. J., June 20 and 21, 1949.



This sound advice soon resulted in action. Many gas companies started dealer programs. A. G. A. in 1931 got together with National Association of Master Plumbers and agreed on a set of merchandising principles designed to broaden the market and to encourage more dealers to stock, display and sell appliances. This set of principles was soon extended through agreements with national groups representing department stores, furniture stores and hardware stores.

No doubt you also are familiar with the laws passed in Kansas and Oklahoma prohibiting public utilities from selling appliances. The Kansas law was challenged and the courts held it unconstitutional. The Oklahoma law has never been challenged and still stands. It is significant that the dominant gas company in Oklahoma has continued to advertise and promote gas appliances and gas service. Dealers in that state, perhaps unusually favored by low-cost natural gas, do a very good job of selling appliances. It is also significant that dealer groups in Kansas were active in supporting repeal of the law because their business suffered when the utilities stopped selling.

In the late 1920's the city of Seattle, Wash., passed an ordinance prohibiting appliance sales by utilities. After one

year's trial, the department stores and other merchants asked for repeal of the law because their business had suffered through lack of utility leadership in aggressive advertising and promotion.

A study of attempts at such legislation in other states proves that the high tide of dealer agitation against utility sales always coincides with a low ebb in appliance business. The worse business gets, the more demands utilities get out.

There are some signs of a revival in such agitation right now. In view of the many social and political changes that have taken place since the last depression, we must be alert to such threats.

It seems highly desirable, therefore, that all gas companies have a program to stimulate dealer activities. To neglect the dealer entirely is to neglect possible assistance in sales. To antagonize the dealer is to invite legislation. An active or even somewhat passive dealer program is good insurance against unfair accusations.

The exact program is your problem. My only suggestion is that you keep the program simple, that you work with only the best stores, and that you make it absolutely necessary for these stores to exert some effort before they cash in on any benefits.

The next thought should be that every gas company needs an active retail

sales organization of its own at a time when the industry is faced with the most intense competition in history. We know that electric competition is trying to take cooking and water heating away from us, and trying to lengthen their lead in refrigeration. And let's not kid ourselves that the coal stoker and oil burner salesmen are going to lie down while we take over as many more house-heating customers as we please.

Just another word about the keen competition for the cooking load.

There are indications here and there throughout the country that electric range manufacturers are really putting pressure on dealers. There is some suspicion that a dealer who wants to handle a complete line of refrigerators and washers, for example, is almost forced to buy electric ranges in varying quantities from the same manufacturer. Such pressure may come from the regional distributor, rather than from the national manufacturer, but it all works out the same way—the dealer has electric ranges in stock so he puts on the steam to sell them.

Such pressure tactics may explain some of the unusually heavy promotion behind electric ranges in cities where the electric range previously never "got to first base." It's a development you should watch carefully in your town.

Any study of the dealer problem must take into account the manufacturing situation.

There are just too many manufacturers of gas appliances. Listed in the A. G. A. Directory of Approved Gas Appliances are the following number of manufacturers:

Residential ranges	60
Water heaters	70
Central heating equipment	125
Conversion burners	65
Space heaters	90

Obviously, there are too many dealers handling too many lines made by too many manufacturers. Listen to some of these figures—authoritative estimates by people who know:

Department stores	500
Plumbers	15,000
Furniture stores	19,000
Hardware stores	10,000
LP-gas appliances dealers ...	7,000
Appliance-radio dealers	100,000

Add them all together, and they total about 150,000 retail stores that are supposed to sell one or more gas appliances.

Now, let's see the volume of business they might do. In what may be considered a typical year the industry probably will sell:

Ranges	2,500,000
Water Heaters	1,500,000
Refrigerators	400,000
Central Heating	500,000
Floor and Wall Furnaces ..	300,000
Space heaters	2,000,000
Laundry dryers and incinerators	200,000
Total	7,500,000

Assume for a moment that all these 7½ million gas appliances are sold by dealers, without any sales by gas companies, mail order houses, direct-to-you outlets, and without any sales to builders and contractors that do not go through regular retail channels.

This would mean that 150,000 retail stores would sell 7,500,000 appliance units. That would be exactly 50 sales per dealer, or one a week.

How can any retail operation be sound and profitable on a one-a-week sale basis! And remember that this figure is predicated on all appliances being sold by dealers. Moreover, about half of the total appliance output goes through channels other than these dealers, so that means the average dealer is selling about two appliances a month.

Obviously, there aren't 150,000 dealers. Let's say there are just half that amount—75,000 dealers. That still brings us back to the one-a-week sale.

And that figure of 75,000 can't be far off. Gas Appliance Manufacturers Association, in connection with the forthcoming Old Stove Roundup, is mailing brochures to 40,000 gas range dealers. There must be another 35,000 who sell all the other gas appliances in the line.

Let's see how 40,000 gas range dealers look in this picture. Let's say the dealers exclusive of gas companies, mail order houses, etc., sell two million gas ranges. That's 50 ranges per dealer per year. There's that sad one-a-week sale again!

Electrical Dealer recently made a survey of Kalamazoo County, Mich., which is considered a typical American county. The survey disclosed 80 appliance stores in the county, but only 35 of these were in existence before the war. The other 45 had sprung up since the war. The mortality of such stores during the last three years was ten percent per year.

Of greatest significance, the 45 post-war dealers did (Continued on page 28)

Commandments

1. Don't wait for the other fellow to come to you; go to him.
2. In competition with others always give them the credit for being a little smarter than you are.
3. If you have no money and little credit, capitalize on your personality. Sometimes it pays to have nerve.
4. Never admit to anybody—least of all to yourself—that you are licked.
5. Keep your business troubles to yourself. Nobody likes a calamity howler.
6. Don't be afraid of dreaming too big dreams. It won't hurt you to plan on owning a railroad, even if you have to compromise on a flivver.
7. Make friends. But remember that the best friends wear out if you use them too frequently.
8. Be square even to the point of finicking and you will have mighty little occasion to complain of a crooked world.
9. Take advice but do your own deciding.
10. Don't toady. The world respects a man who can stand on his own legs and look the world in the eye.

—Toronto Ad-Sales Events



(Inset at right) John Kean, president, Elizabethtown Consolidated Gas Co., presenting charter to junior achievement company group sponsored by the utility. In the background teen-age members of the junior firm are shown at work in one of the gas company's modern kitchens

Junior achievement pays off

Completion of a novel junior achievement company project at Elizabethtown Consolidated Gas Co., Elizabeth, N. J., has brought notable results of value to both the gas company and students involved.

Through the cooperation of the home service department, the utility has received important publicity and made many desirable new contacts. Teen-age members of the junior achievement company have learned how to operate their own firm, how to keep business and production records, map sales campaigns, prepare financial statements and other business operations.

Patterned as an integral part of the junior achievement drive which has gained the backing of business and educational leaders throughout the nation, the project is a leisure-time program planned not to interfere with school studies, recreation and social activities.

Characterized by Mrs. Mary N. Hall, home service director, as "our most outstanding and different activity," the junior achievement group sponsored by the utility was recruited from Battin High School in Elizabeth and titled Bat-Hi Cookie Company. The project was initiated on November 30, 1948 and continued through May 10, 1949.

Operations of the group were patterned closely on those of an actual company—stock was sold for working capital and rent was paid.

Under the guidance of three advisers from the gas company, the group became well acquainted with actual business practices and problems. All activities were designed to coincide with the keynote of Junior Achievement, Inc.—"learn by doing."

Children employed by the Bat-Hi Cookie Company met regularly in one of the gas company's kitchens which was set up with three gas ranges. Rent was paid for use of the space and a deposit was made to cover use of the gas equipment. Later, the deposit, less

depreciation charges, was refunded when the company was liquidated.

Teen-agers in the company also prepared a weekly payroll. A major item of expense was the cost of raw materials and supplies, all of which was borne by the junior company.

Approximately 72-dozen refrigerator cookies were "manufactured" by the Bat-Hi company each week and sold to customers at 30 cents a dozen.

Financial operations of the Bat-Hi firm showed student members that a combination of capital, management and labor is required to run any business venture successfully. An issue of 200 shares of stock was authorized at 50 cents a share, but it was necessary to sell only 127 shares to obtain sufficient working capital. At liquidation, a ten percent dividend was paid on all outstanding stock and the remaining profits were distributed among members of the company on the basis of attendance.

Members of the junior achievement company learned to appreciate the value of gas service and modern gas equipment such as automatic gas ranges built to CP standards, gas refrigerators, and automatic gas water heaters. Additional value from the course, Mrs. Hall declared, was obtained by several of the teen-agers who were planning to make careers in the commercial field.

A. G. A. exhibits before plumbers group



American Gas Association display booth at annual convention of National Plumbers Association in Cleveland, Ohio May 30-June 3. Trudy Ryan, "queen" of GAMA Court of Flame, explains purpose and operation of the nationwide gas water heater program. Clifford E. Hall, A. G. A. (far right) shows a visitor how to use A. G. A. slide-rule for correct sizing of automatic gas water heaters

Synthetic fuels

(Continued from page 20)

Assume now that enough time has passed so that, by virtue either of economic or security necessity, the country is producing one million barrels per day of synthetic liquid fuel and that, for purposes of reckoning, 75 percent of this hypothetical output will be produced near enough to transmission mains and population centers to make the gas useful. Considering only a high-Btu gas and assuming that either process makes the same quantity and composition of gas, there will be available about 710 million cubic feet per day or, roughly, $7\frac{1}{2}$ million therms per day. This amount of gas is about $1\frac{1}{2}$ times the 1946 consumption of the four largest cities in the country—New York, Chicago, Philadelphia and Detroit—and about 90 percent of

the total manufactured-gas production of the entire United States in 1944. The Big Inch pipeline is to have an ultimate capacity of something over 900 million cubic feet per day—not a great deal more than the production from this million barrels of synthetic fuel.

Certainly in any long-range real necessity for substitute fuels, the production of one million barrels per day is not unreasonably large, and gas production of this order of magnitude indicates the extent to which this potential industry may affect the future of the gas business.

Next assume that more time has passed and that the total production of synthetic liquid fuels in the country has now reached eight million barrels per day. Granting the depletion of petroleum reserves within the next several decades, such a synthetic production would not be at all unreasonable.

Still assuming that only three-quarters of this gas is produced in areas where it can be usefully distributed, there would be available over $5\frac{1}{2}$ billion cubic feet per day. This amounts to more than 90 percent of the total sales to consumers of manufactured and natural gas combined for the entire United States in 1944 and would certainly be a large share of the gas consumption in this future period.

These preliminary figures indicate that there will not be enough by-product gas from synthetic fuels to replace completely the present supplies of natural gas or to satisfy the demand that can reasonably be expected at the future date we are considering. On the other

hand, there will be enough to provide a reliable and, at that time, probably very economical source for at least a major part of the demand.

The costs indicated are higher than those natural gas commands at present, but may be appreciably below the price natural gas will command when synthetic fuels are produced in quantity.

The foregoing figures are based on a process in which conditions are set for the most efficient and economical production of synthetic fuels. It is quite conceivable that the future situation will justify planned operations which will yield slightly smaller amounts of liquid fuels and increased quantities of high-Btu gas.

It has been proposed in the past that process changes of this sort might be made seasonally, so that the peak of gas production came in winter and the peak of liquid fuels in the summer and fall, when they are most in demand.

Basically the production of gas is constant and proportioned to the production of synthetic liquid fuels. By raising the operating temperatures, the volume of gas produced may be increased to meet seasonal demands. This would result in a decrease in oil production. Although the costs would be increased, this method might nevertheless be economical because it would not require additional investment in gas production facilities.

The simplest method to meet peak loads would be to add the large amounts of LP-gas (propane and butane) to the city gas. The same synthetic fuel plants that are capable of supplying $7\frac{1}{2}$ million therms of city gas per day will have a potential LP-gas production of approximately 500 billion Btu (five million therms) per day. The cost of meeting the peak load in this manner, figured on a therm basis, would, however, be about double the cost of the base-load gas.

The figures quoted in this article are necessarily preliminary. They must be verified in future by operation of semi-commercial or commercial units and the relationship between liquid and gaseous fuel production must be established. It is believed that the impact of a synthetic-fuels development on the gas industry will be important and far-reaching and that gas-production men, in searching for potential new sources of supply, must count in their plans the gas that will be obtained from synthetic fuels.

Food for thought

● When you buy for price you can never be sure. It's unwise to pay too much, but it's worse to pay too little. When you pay too much, you lose a little money, that is all. But when you pay too little, you sometimes lose everything, because the thing you bought was incapable of doing the thing it was bought to do.

If you deal with the lowest bidder, it is well to add something for the risk you run. And if you do that, you will have enough to pay for something better.

—The Aetna-izer

*Flexible system at Pacific Gas
& Electric employs single tabulating card*

Combination billing service

By HARRY MCGANN

*Auditor of Division Accounts
Pacific Gas and Electric Co.
San Francisco, Calif.*

A centralized billing unit known as Customer's Records Department was established by Pacific Gas and Electric Company in 1929 when the domestic and general service commercial accounts of three divisions were consolidated and the newly-established department placed under jurisdiction of the general office.

These three divisions have an over-all total of 410,000 gas meters and 450,000 electric meters serving domestic and commercial customers. As a result, at the present time the centralized billing unit each month issues 505,000 customers' bills and maintains the corresponding accounts receivable. (Customers' meter deposits and sundry sales accounts are also on the centralized billing unit tabulating system but are not combined.)

The tabulating machine billing system originally installed required the use of separate tabulating cards for the billing of each service of combination gas and

electric accounts. But a few years later, with the introduction of 80-column tabulating cards and equipment one card was eliminated and we began billing combination services from a single tabulating card.

This single tabulating card serves as a medium from which customers' gas and electric services are billed, as a basis for accumulating gas and electric revenues, and also as a customers' accounts receivable ledger card. Finally, the cards cleared from accounts receivable are listed by tabulating machines on register sheets to show a history of the customers' accounts for reference, general information and statement of account purposes.

The general system of customers' accounting and billing is flexible in its operation to the extent of recognizing that district offices of North Bay and San Jose Divisions are required to have more detailed information concerning customers' accounts than in the case of San Francisco Division—(metropolitan area accounts) which has offices close to the centralized billing unit.

In North Bay and San Jose Divisions, the meter books are retained in district offices, except during the period for meter reading and when in transit or in the centralized billing unit for the billing

of customers' accounts. "Paid and unpaid bill" files are also maintained in these offices to enable office personnel to answer questions and furnish information to customers relative to their respective accounts, also upon requests from various sources to prepare statements of accounts.

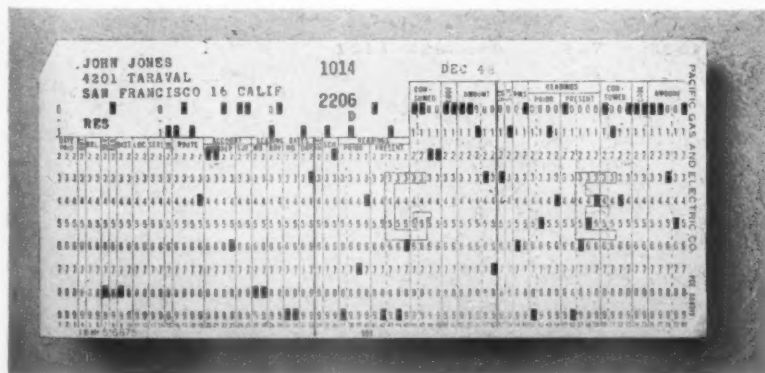
Procedure with respect to maintaining "Paid and unpaid bill" files is to file current "office copies" of customers' bills in route and account order. As customers' bills are paid the corresponding "office copies" are removed from "unpaid bill" file, stamped "paid" and filed in "paid bill" file, and held there for a maximum of one year. (Bills in these two files are not balanced records.)

In the case of San Francisco Division accounts, the meter books are retained in the centralized billing unit (except when out for meter reading) and paid and unpaid bill files are unnecessary for the reason that the centralized billing unit is located in San Francisco, and all information relative to customers' accounts is readily available to this division.

A definition of certain terminology is helpful in understanding detailed procedures in the customers' records departments.

Serial—Regular billing operations are on a serial basis in order that the work may be evenly distributed over a one-month period (21 serials each month). A serial is comprised of one day's work for the meter reading force, collection department and centralized billing unit clerical forces.

Advanced Card File—This file contains tabulating cards held awaiting receipt of next month's meter readings. Each card is prepared as follows: After the current billing cards have been proven to be correctly punched, they are placed in the reproducing punch. The "previous reading and date" automatically punched in the advanced card is



Single tabulating card which serves as a medium for billing customers' gas and electric services

the "present reading and date" in the current billing card.

Billing Card—Ledger Card (80-column tabulating card)—The terms "billing tabulating card" and "ledger tabulating card" are synonymous. The billing tabulating card is a "billing card" in the Billing Section, which later becomes a customers' ledger card in the Ledger Section.

Cycle Balance—Represents the accounts receivable outstanding, by serials, on or immediately prior to meter reading date and before current month's bills are prepared.

The centralized billing unit is comprised of the following sections: Addressograph, Key Punch, Compare, Tabulating, Billing, Ledger and Accounting—Report Control Sections.

Addressograph Section—Each day one serial of meter books are checked with addressograph plates for the purpose of cutting plates for new customers and/or making corrections required to bring plates up to date with the meter books.

Customers' bills are cut (from rolls of paper), Addressographed and printed (front and back) on Addressograph bill printing machine, in a single operation.

Immediately upon completion of the foregoing operations, the plates are placed in a second Addressograph machine for Addressographing tabulating cards for the advanced card file.

Addressograph customers' bills and Addressographed advanced tabulating cards are then routed to the Compare Section.

Key Punch Section—Equipment in operation in the Key Punch Section consists of 14 key punch machines and one check tabulator, requiring an operating personnel of 17 employees, including the supervisor.

When the meter books are received in the Key Punch Section, operators punch the following information in the advanced file tabulating cards:

Tabulating cards are then run through check tabulator for verification of punching and correctness of subtractions, following which the now current tabulating cards and meter books are routed to Compare Section.

Compare Section—Meter books and "current month" tabulating cards are compared upon receipt from the Key Punch Section. This comparison is for sequence, verification of key punching of irregular billing, changes in customers' accounts as recorded in meter books, and to give effect to said changes insofar as the Addressographed customers' bills and current month's tabulating cards are concerned.

At this point, the basic information on "current month" tabulating cards, which is to be used in connection with next month's billing, is transferred or reproduced on the previously Addressographed tabulating cards. These "tabulating cards" are held in the Compare Section—advanced file—until meters have been read during the ensuing month.

"Current month" tabulating cards are then routed to Tabulating Machine Section and Addressographed customers' bills to Billing Section. The meter books are forwarded to the Ledger Section in the case of San Francisco Division customers' accounts, and to the respective

district offices for North Bay and San Jose Divisions.

(Compare Section tabulating equipment consists of one reproducer).

Tabulating Machine Section—The "current month" tabulating cards, when received in the Tabulating Machine Section, are sorted to eliminate all cards on irregular billing. The remaining cards are sorted—first, by gas rate schedules and second, by gas consumptions, with the result that all cards of same gas consumption are grouped by respective gas rate schedules.

"Grouped—gas consumption" tabulating cards are priced and checked by electric reproducing machines from master rate extension cards.

The operation with respect to the electric service is identical with the procedure for gas, i.e. cards are sorted by electric rate schedules—by electric consumption, and priced.

These tabulating cards are then run through an electric interpreter machine for printing of route number—account number—gas charge and electric charge on upper portion of cards for subsequent ready reference.

All "gas service" tabulating cards are sorted back to route numbers, then by rate schedules and revenue account numbers. Next step is to run a revenue tabulation of the cards controlling by route numbers—rate schedules and revenue accounts to obtain and/or accumulate revenues by routes (i.e., by meter books). Summary control cards are punched simultaneously by use of summary punch machine (connected to the electric tabulator) for cycle balance control.

The above operations are duplicated in the case of electric service accounts.

At the close of each day's business summary control cards are further summarized by punching a second set of

*Current month's date

Current month's meter readings

Usage (subtractions as made by meter reader)

Billing charge (irregular billing only)

* Master card used for this purpose.

OFFICE: PACIFIC GAS AND ELECTRIC COMPANY DEC 1948										DEC 1948 PACIFIC GAS AND ELECTRIC COMPANY										P.G.E. SAN FRANCISCO DIVISION 440 SUTTER STREET DEC. 1948													
DATE		METER NO.		METER READING		METER READING		METER READING		METER READING		METER NO.		METER READING		METER READING		METER READING		METER NO.		METER READING		METER READING									
DEC 13	9186	220	1.37	6	9186	9174	22	100	1.37	6	9186	9174	22	100	1.37	6	9186	9174	22	100	1.37	6	9186	9174	22	100							
DEC 13	9654	140E	3.50		9654	9514	140	100	3.50		9654	9514	140	100	3.50		9654	9514	140	100	3.50		9654	9514	140	100							
				4.87					4.87					4.87					4.87					4.87					4.87				
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THIS BILL IS NOW DUE AND PAYABLE. PLEASE BRING IT WHEN PAYING AT ANY P. S. AND E. OFFICE OR AUTHORIZED PAY STATION LISTED ON REVERSE SIDE.										THIS BILL IS NOW DUE AND PAYABLE. PLEASE BRING IT WHEN PAYING AT ANY P. S. AND E. OFFICE OR AUTHORIZED PAY STATION LISTED ON REVERSE SIDE.										THIS BILL IS NOW DUE AND PAYABLE. PLEASE BRING IT WHEN PAYING AT ANY P. S. AND E. OFFICE OR AUTHORIZED PAY STATION LISTED ON REVERSE SIDE.													

Customers' combination bill for gas and electric service of the type which is used successfully in centralized billing unit at Pacific Gas & Electric Company

Gas featured at restaurant show



A. G. A. combined commercial gas exhibit in Atlantic City where manufacturers of heavy duty cooking equipment and gas water heaters exhibited

Twelve bright new mechanical gas flames marked the boundaries of the American Gas Association's combined exhibit at the thirtieth annual exposition of the National Restaurant Association in Atlantic City, May 24-27. Under the banner of "Gas Equipment on Parade," 19 manufacturers of heavy duty commercial cooking equipment made up the largest single exhibit of this popular show in the volume food service field.

More than 13,000 persons visited the many exhibits in Atlantic City's giant exposition hall. Throughout the four days of the show hundreds of interested restaurant people flocked to the combined gas exhibit. The spinning flames could be seen immediately on entering the auditorium as the A.G.A. area was practically in front of the main entrance. This prominent position influenced guests to turn toward the two main aisles where three 100-foot rows of heavy duty gas cooking appliances were on display. A

special lounge provided access to all parts of the gas area.

Several newcomers joined the A.G.A. combined exhibit this year. Two of these, Ruud Mfg. Co., Pittsburgh, and A. O. Smith Corp., Milwaukee, were manufacturers of gas-fired water heaters which joined Sellers Engineering Co., a previous exhibitor, in featuring heaters for adequate supply of two-temperature water for dishwashing and sanitizing.

A. O. Smith also exhibited an operating two-temperature gas water heater to supply a dishwashing machine and sinks in the "Idea Center." Large dial thermometers in plain view enabled visitors to see the actual water temperature. In the same area, refreshments were served free to guests.

Two other new exhibitors cooperating with A.G.A. were Market Forge Co., Everett, Mass., which demonstrated a new small-volume pressure cooker suitable for counter operations, and Tru-

bake Gas Oven Co., New York. The latter company's product, a deck oven, features top and bottom burners under separate thermostatic control and heavy insulation in its stainless steel frame and doors.

Cleveland Range Company connected a gas supply to its new junior-size steam cooker which was shown for the first time at last year's show in Cleveland. Added to the long list of deep fat fryers was the new fryer developed by American Stove Company. The manufacturer claims that a feature of this appliance is extremely rapid recovery due to a new pattern of firing.

Exhibitors who participated in the combined exhibit were as follows: American Stove Co., Cleveland, Ohio; Anetsberger Brothers, Inc., Northbrook, Ill.; The G. S. Blodgett Co. Inc., Burlington, Vt.; Cleveland Range Co., Cleveland, Ohio; Detroit-Michigan Stove Co., Detroit, Mich.; Duke Mfg. Co., St.

Louis, Mo.; Groen Mfg. Co., Chicago, Ill.; B. H. Hubbert & Son, Inc., Baltimore, Md.; Lyons-Alpha Products Co. Inc., New York, N. Y.; Market Forge Co., Everett, Mass.; National Cornice Works, Los Angeles, Calif.; J. C. Pitman & Sons Sales Corp., Lynn, Mass.; Sellers Engineering Co., Chicago, Ill.; Robertshaw-Fulton Controls Co., Greensburg, Pa.; Ruud Mfg. Co., Pittsburgh, Pa.; Savory Equipment Inc., Newark, N. J.; A. O. Smith Corp., Milwaukee, Wisc.; Standard Gas Equipment Corp., Baltimore, Md.; Trubake Gas Oven Co. Inc., New York, N. Y.

Numerous exhibits throughout the show featured gas-fired heavy duty cooking equipment. One of these was the exhibit of the U. S. Army Quartermaster Corps in which a display of large charts plotted the relative efficiencies of various makes of deep fat fryers using different fuels tested recently at Camp Lee. Brand names were not shown, but on completion of the testing program to determine specifications for equipment purchase, both the complete data and the brand names will be released. At the same time the National Restaurant Association will publish results of the tests.

Another popular exhibit was the display by *Institutions Magazine* of winners in their 1949 contest. Results in all classifications showed that 33 of the 43 winners have gas-equipped kitchens.



Food Service Equipment Committee meeting during National Restaurant Exposition in Atlantic City. (Clockwise around the table) C. C. Hanthorn, Philadelphia; L. E. Clancy, Detroit; G. A. Seale, New York, N. Y.; R. S. Chapman, Atlanta, Ga.; E. J. Horton, Youngwood, Pa.; J. J. Bourke, A. G. A.; J. V. Hall, Hammond, Ind., chairman; M. A. Combs, A. G. A.; D. J. Brogan, Burlington, Vt.; E. H. Lerch, Rochester, N. Y.; M. H. Douglas, Baltimore, Md.; W. H. Frick and R. G. Juergens, Cleveland, Ohio; J. A. Rockefeller, Newark, N. J., and E. H. Mattson, Atlantic City, New Jersey. Other meeting shown below



Recent meeting of Joint A.G.A.-GAMA-FSEI Committee in Atlantic City. (Clockwise around the table) D. J. Brogan, Burlington, Vt.; L. E. Clancy, Detroit, Mich.; M. H. Douglas, Baltimore, Md.; G. O. Dove, Jr., Washington, D. C.; E. H. Lerch, Rochester, N. Y.; J. J. Bourke, A. G. A.; J. V. Hall, Hammond, Ind., chairman; M. A. Combs, A. G. A., and E. V. Fineran, Washington, D. C.

Appliance merchants

(Continued from page 22)

only 20 percent of the total appliance business; the 35 pre-war dealers did 80 percent.

Only 18 dealers have any sort of sales training program, and that means they encourage their salesmen to participate in programs offered by manufacturers or distributors.

The average volume for all 80 stores was \$54,000 last year, or a total of \$4,320,000 in appliances. The 45 postwar dealers did an average of \$19,000 appliance business last year; the 35 pre-war dealers averaged \$99,000 in the same line.

Refine this a little further. Of the total 80 stores, 15 did 66 percent of the volume. That means that 18 percent of the stores made two-thirds of the sales. These top 15 stores averaged \$190,000 in appliance sales last year.

Now, which would you rather have—a group of 45 salesmen selling \$19,000 a year; a group of 35 salesmen selling \$99,000 a year; or a group of 15 salesmen selling \$190,000 each?

I think we are in that sort of a selective selling period right now—we must be aggressive but selective in re-building our own sales departments. We must be equally aggressive and equally selective in building dealer sales organizations.

A recent Dun & Bradstreet report should give added concern over this situation: "Every business day for the last three years, an average of 2,250 new concerns were added to the Dun & Bradstreet Reference Book of American business. . . . A large part was formed by returning G.I.'s who entered the retail lines in great numbers. . . ."

Of greatest interest to the industry is the fact that appliance and radio stores expanded faster than any other line in 1946, and in 1947 were passed only by

motor vehicle dealers and home furnishings stores.

A special study of business failures in 1948 showed that 89 percent were among concerns established since 1939. That should be a warning to manufacturers who appear so eager to expand their retail outlets. There already is evidence of distress merchandise in many markets, adding to the confusion set up by declining appliance sales.

Too many dealers selling too few appliances in too many lines made by too many manufacturers. What's the cure?

The answer is in that one word "dealer." A dealer is a storekeeper. He rents a 20-foot front, puts a couple of appliances in the window, and then sits back and waits for customers to come in. They did come in droves for a good many months after the war, but they are staying away now.

Lack of intelligent and intensive advertising, promotion and outside selling

is making the dealer pay a heavy price. There will be fewer dealers in the near future. Those who have adequate financing and adequate merchandising methods will survive.

The merchant will survive; the dealer will fold up. What is the difference between a dealer and a merchant?

Think of a merchant as one who puts into practice the "Four M's" of modern gas appliance merchandising. He studies his market, his trading area, his neighborhood. He knows his people, what they want, how much they can pay. Market is the first M.

The second M is methods. He puts into effect the most modern methods of cultivating that market. He uses window displays, floor displays, live demonstrations, newspaper advertising, direct mail, radio, billboards, car cards—whatever combination of these that he finds best. He puts salesmen out ringing doorbells. He uses showmanship in promotion. Those are modern merchandising methods.

The third M is mechanics—the proper mechanics of installation and service so that the merchant creates an ever-widening circle of satisfied customers. Through proper mechanics of installation and service, the merchant finds himself happily "using the user" to uncover new prospects for increasing sales.

The fourth M is manpower. If the merchant is a true merchant, he never tries to do it all himself. He selects manpower carefully and trains it thoroughly. He applies adequate and proper manpower to selling, installation and service. He manages his merchandising business.

Market, methods, mechanics and manpower are the "Four M's" of modern gas appliance merchandising. They are more essential today than ever before in history.

Back in 1928, Mr. Fogg was absolutely right—we needed more sales outlets. Today, we have too many sales outlets, too many storekeepers, too many dealers, too many retailers who neglect one or two or all four of the M's.

Some of the estimated "150,000 retail outlets" for gas appliances today are competing just as unsuccessfully against merchants of electric appliances as our lighting fixtures competed against the Mazda.

Thus in the months and years of tough competition that lie ahead, the gas industry should think in terms of merchant magnification as a successor to dealer cooperation. Its sights must be

lifted from the traditional cooperation with dealers to the absolutely essential magnification of merchants—"magnification" and not "multiplication." We do not want to multiply gas appliance stores; we want to magnify, make larger, make stronger, more profitable the fewer number of progressive merchants who practice the four M's of modern gas appliance merchandising.

We have been that way about dealer cooperation. We have accepted the basic idea, perfectly sound 20 years ago, that we needed more and more sales outlets, storekeepers, dealers. Suddenly, intense competition plus business decline have wakened us to the need for merchandising, not storekeeping.

You can help this merchant with the four M's. You can help him know his market better. You can help him learn and apply better methods of cultivating that market. You can teach him the proper mechanics of installation and service, help him recruit and train the manpower he needs. You can help him to help himself, without need for subsidy, bonus, commission or other tribute paid for work either poorly done or not done at all.

Impossible? It's just as impossible as the fact that a bumblebee can fly. By every law of aerodynamics, by every fact known to aviation engineers, the bumblebee cannot fly. He is so constructed that it should be impossible for him to get off the ground. The ratio of his wingspread to weight is ridiculous. He just *can't* fly.

But the poor, stupid bumblebee never went to college. He can't operate

a slide rule. He doesn't know he can't fly, so he just keeps buzzing around and getting plenty of honey.

Let's be bumblebees. Let's prove that merchant magnification is the successor to dealer cooperation.

Old stove round-up

(Continued from page 11)

facturer will prepare individual tie-in promotions on his own product. Cowboy themes will be used in all consumer and dealer advertising, promotions and displays and the campaign will be launched in many communities by street parades, dealer open houses and cooking schools and mass meetings, sponsored by local gas utilities and dealers.

Special brochures will be mailed direct to the 40,000 top ranking dealers by Gas Appliance Manufacturers Association. The Liquefied Petroleum Gas Association will aid in carrying on the campaign in rural areas.

Details of the program will be outlined to gas utilities, manufacturers and dealers at special meetings held during July and August. Wherever possible, these meetings will be held in fair grounds or other outdoor arenas and will be featured by roping contests, horseshoe pitching contests, and other events which will give a western round-up atmosphere.

Special regional sales awards will be presented to sales leaders in various parts of the country.

Metal show exhibit plans completed



A. G. A. Committee on Displays at National Expositions completing final arrangements for the gas industry's combined industrial gas exhibit to be held at National Metal Show in Cleveland, October 17-21, 1949. (Left to right) L. H. Barry, Philadelphia, Pa.; W. D. Relyea, Newark, N. J.; C. E. Cunningham, Philadelphia; H. L. Wathen, Atlantic City, N. J., chairman, and M. A. Combs, A. G. A.

Spring Lake meeting stresses sales needs

A powerful program stressing the urgent need for intensive selling by gas utilities, gas appliance manufacturers and appliance dealers, was presented to an audience of nearly 200 sales executives and gas industry representatives at Spring Lake, N. J., June 20 and 21, 1949. The occasion was the annual New York-New Jersey Regional Gas Sales Conference sponsored by the Association's Residential Gas Section.

A parade of prominent speakers told their listeners that planned, creative selling was never more important than now in order to lift production and distribution figures and bring utilities and manufacturers a fair return on their invested capital. It is equally important, they declared, to prove the fallacy of the argument that a satisfactory profit margin can be maintained when wage and materials costs are raised and prices lowered.

Walter G. McKie, manager, domestic sales department, Rochester Gas & Electric Corp., and chairman, New York-New Jersey Regional Gas Sales Council, opened the conference with a brief talk on the need for hard-hitting sales programs to counteract price-cutting policies that are glutting the market with appliances that fail to lift volume. Dealer cooperation is necessary, he stated, if gas utilities do not wish to prevent any additional legislation intended to drive gas utilities out of merchandising. Such legislation has been passed in some states and is being considered in others, Mr. McKie warned.

Stanley C. Gorman, sales promotion director, Gas Water Heater Division, Gas Appliance Manufacturers Association, reported on the encouraging results already achieved under the Court of Flame program. Sales of automatic gas water heaters, under the stimulus of the nation-wide drive, have shown a satisfactory increase in the past two months, and there is every indication that the all-

time record level of sales attained last year may be equalled or passed in 1949.

The gas water heating load is one of the gas utility company's most profitable branches. A new approach to capturing this potential market through an appeal to feminine instincts was demonstrated by Jane O'Brien, with the assistance of Florence Wren. Both speakers serve as home economics advisers with Public Service Electric and Gas Company of New Jersey. Their skit, "Charm On Tap," won an American Gas Association Achievement Award last year through its clever interpretation of the important part hot water plays in accentuating feminine charm.

Manufactured gas companies, particularly those in the Northeast, are vitally interested in the advent of natural gas. R. F. Brower, system engineer, Consolidated Edison Co. of New York, Inc., gave an interesting and timely presentation on "What's Ahead For Natural Gas." Using his own company's experience as a yardstick, Mr. Brower reviewed the important economic phases that preceded the decision of Consolidated Edison to turn to natural gas as a supplementary and additional source of fuel energy.

He showed that manufactured gas companies were caught between spiraling costs of production and constantly increasing demands of customers, with costs of manufacturing gas nearly doubling from 1941 to 1949. His company increased its output nearly 75 percent in that period, yet was running its gas business at a loss in 1948, he declared. Natural gas will serve three purposes for manufactured gas companies, Mr. Brower said. It will reduce production costs, stabilize future costs and provide additional capacity.

Automatic gas clothes dryer is one of the new appliances that brings a profitable load to gas utility companies and is



"Miss Cinderella" glamorizing the Court of Flame automatic gas water heater drive. (Below) Walter G. McKie, Rochester, N. Y., chairman, New York-New Jersey Regional Gas Sales Council



of real service in eliminating wash-day drudgery for the housewife. Nevertheless "there are no 'buyers' for dryers," W. N. Brown, eastern regional manager, Hamilton Manufacturing Co., told his audience. Although a potential market for 2,800,000 automatic gas clothes dryers over the next 4½ years has been conservatively estimated, it is necessary to sell the advantages of this new appliance to the housewife. Wash days depend entirely on the ability to dry clothes and there are approximately only 18 good drying days out of every 52 wash days. Automatic gas clothes dryers eliminate guesswork in scheduling wash days, cut out nearly five hours of weekly washing labor, and save housewives from carrying an average of 45 pounds of laundry eight-tenths of a mile in drying clothes each week, Mr. Brown said.

The next five to ten years will offer one of the greatest opportunities in all history for constructive selling, Jack Lacy, president, Lacy Sales Institute, Boston, predicted. With almost every type of business trying to make a net profit in the face of rising costs, expert salesmanship is badly needed. Savings are accumulating while buyers await further declines in prices. Manufacturers are spreading their range of products to increase volume, but this does not seem to be the entire answer. The present narrow gap between production costs and retail prices can best be widened by training more productive salesmen so that the total volume can be increased with smaller proportionate expense.

Mr. Lacy, who has personally trained more than 8,000 salesmen, pointed out that although many large industries have been conducting intensive sales training courses for the past few years, relatively few gas utilities have embarked on such a program.

At the Tuesday session, William J.

Schmidt, general sales manager, Long Island Lighting Co., Mineola, N. Y., as chairman of the council nominating committee, presented the names of George Kelly, Westchester Lighting Co., Mt. Vernon, N. Y., as chairman for the coming year, and W. D. Williams, Public Service Electric & Gas Co., as vice-chairman. Nominees were elected unanimously.

Mr. Kelly presided at the Tuesday conference and in his opening talk urged the initiation of more intensified training programs for salesmen. He asked for closer cooperation with neighborhood dealers and appliance outlets. Electric competition aggressively is seeking such outlets, he said, and the gas industry must be alert or get crowded out of part of the appliance distribution system.

Range symposium

John W. West, Jr., assistant managing director, A. G. A., headed a symposium devoted to the active promotion and sale of automatic gas ranges built to CP standards. The creative salesman is coming into his own again, Mr. West declared. While gas appliances have many inherent advantages over competitive products, expert salesmanship is needed to bring the story of these advantages to dealers and the public.

Julius Klein, vice-president, Caloric Stove Corp., Philadelphia, urged continued support by the industry of the CP program. He reiterated the statement of a previous speaker that two large electric appliance manufacturers have trained about 38,000 salesmen to sell electric ranges, while figures indicate only about 2,150 trained appliance salesmen in the gas industry.

Irene Muntz, home service director, Rochester Gas & Electric Corp., told of an important new market—young brides who know little of the advantages of

gas appliances. Changed buying habits call for changed sales techniques, Miss Muntz pointed out. She urged "action" in sales programs, citing several ways in which a prospective customer could join in the demonstration of a gas range by actually cooking food.

Ray Babb, appliance division manager, Quackenbush Co., Paterson, N. J., an authority on department store appliance sales, described different sales promotion and sales techniques used by dealers. Electric range manufacturers have initiated a definite trend toward consumer purchasing by large scale national advertising. Gas utilities and gas appliance manufacturers have an opportunity to offset this by more intensive work at the local level, he said. He pointed out that dealers' salesmen need better training in nearly every phase of salesmanship.

Speaking in the place of Carl H. Horne, vice-president, Alabama Gas Corp., Birmingham, who was unable to attend, H. Vinton Potter, A. G. A. coordinator, promotion, briefly described methods used to effectively coordinate sales, advertising and promotional efforts of the industry into unified campaigns with greatly increased impact. He told how campaign themes have been evolved through recommendations of committees as to what gas utilities desired at particular seasons of the year.

Mr. Potter then presented a preview of proposed promotional campaigns for the next two years, comprising separate campaigns for promoting gas water heaters, gas ranges, gas refrigerators and house heaters, with additional promotional effort devoted to summer-winter gas air conditioning, automatic gas laundry dryers and gas incinerators. The two-year program will open with an "Old Stove Roundup" this fall.

Richard A. Plata, assistant sales man-

(left to right) George Kelly, Mount Vernon, N. Y., elected chairman, New York-New Jersey Regional Gas Sales Council for coming year; R. F. Brower, New York, N. Y., speaking on natural gas; Irene Muntz, Rochester,

N. Y., describing an important new market for gas appliances; R. A. Plata, Staten Island, N. Y., stressing importance of New Freedom Gas Kitchen Program, and F. K. Doscher, New York, N. Y., discussing sales training



ager, New York & Richmond Gas Co., Staten Island, N. Y., delivered an illustrated talk that impressively stressed the importance and effectiveness of the New Freedom Gas Kitchen program as a vehicle for selling gas appliances. He showed that the gas industry's program has been so successful that the electric industry is now embarking on an all-electric kitchen program. Companies representing approximately 60 percent of the industry's gas meters are now actively promoting New Freedom Gas Kitchens as one of the most satisfactory methods of promoting sales of gas ranges, gas refrigerators and gas water heaters, he reported.

Harold W. Springborn, managing editor, *Gas Age Magazine*, delivered a thought-provoking talk on "Magnification of Merchants." Pointing out the terrific increase in the number of appliance dealers that has taken place over the past ten years, and balancing this growth against the large number of failures in this field, the speaker declared

that there are too many manufacturers and too many dealers today. Statistical surveys show that a small segment of the manufacturing group produced a large majority of the appliances and that a correspondingly small number of the existing appliance dealers were responsible for the great bulk of appliance sales.

To remedy this situation Mr. Springborn recommended a greater effort by manufacturers and gas utilities to increase the selling efficiency of the better dealers. (Paper reprinted in this issue of the MONTHLY.)

Conference sessions closed with a dynamic presentation on sales training by Fen K. Doscher, vice-president, Lily Tulip Cup Corp., and president, New York Sales Executives Club. Tracing modern procedures in sales training from the selection of sales personnel through to the final observation of the trainee in actually effecting sales, Mr. Doscher held the interest of his audience throughout his inspiring talk.

The effectiveness of sales training lies in teaching the principles involved, he declared. Trainees must be made to see how training can make them top flight salesmen. Salesmen are not born; they are selected and trained, he declared. He pointed out that since a cost of approximately \$2,000 is involved in training a salesman, the old practice of selecting ten prospects in the hope of securing five good salesmen is economically unsound. Sales managers today are striving to reduce turnover in sales forces and this can be accomplished best through careful screening of applicants in the selection process and then by scientific training of those finally selected.

Friendship hours were conducted both days of the conference under sponsorship of a group of gas appliance manufacturers. More than 200 members, wives and guests attended the banquet Tuesday evening where prizes for the golf tournament were distributed and a gas clothes dryer used in the demonstration was presented as a door prize.

A.G.A. nominates

(Continued from page 4)

C. H. Zachry, president Southern Union Gas Co., Dallas, Texas

For Director—term expiring October 1950 (vacated by George F. Mitchell who has been nominated for vice-president)

Charles G. Young, vice-president, Springfield Gas Light Co., Springfield, Massachusetts

Accounting Section

For Chairman—John H. W. Roper, supervisor of customer accounts, Washington Gas Light Co., Washington, D. C.

For Vice-Chairman—Alan A. Cullman, assistant treasurer, Columbia Engineering Corp., New York, New York

Industrial and Commercial Gas Section

For Chairman—D. W. Reeves, general sales manager, Oklahoma Natural Gas Co., Tulsa, Oklahoma

For Vice-Chairman—Carl H. Lekberg, staff supervisor, industrial gas engineering, Northern Indiana Public Service Co., Hammond, Indiana

Manufacturers' Section

For Chairman—Carl A. Schlegel, vice-president and gas sales manager, United Engineers & Constructors Inc., Philadelphia, Pa.

Residential Gas Section

For Chairman—H. Preston Morehouse, assistant sales manager—gas, Public Service Electric & Gas Co., Newark, New Jersey

For Vice-Chairman—C. H. Horne, vice-president, Alabama Gas Corp., Birmingham, Alabama

Technical Section

For Chairman—Ernest G. Campbell, general superintendent, distribution, The Peoples Gas Light & Coke Co., Chicago, Illinois

For Vice-Chairman—R. Van Vliet, general superintendent, New York and Richmond Gas Co., Stapleton, Staten Island, New York

Laboratories Managing Committee

For Chairman—Arthur F. Bridge, president and general manager, Southern Counties Gas Co., Los Angeles, California

For Vice-Chairman—Charles E. Bennett, president, The Manufacturers Light & Heat Co., Pittsburgh, Pennsylvania

Publicity and Advertising Committee

For Chairman—R. G. Barnett, vice-president and general manager, Portland Gas & Coke Co., Portland, Oregon

For Vice-Chairman—C. J. Allen, vice-president—public relations, The Connecticut Light & Power Co., Waterbury, Connecticut.

Advertising

● What would happen if you stopped advertising:

1. Based on a large mass of data, eight percent of current purchases are due to current advertising.
2. Based on 22 actual cases, sales declined 12 percent in approximately one year when advertising was omitted.
3. According to opinions of 61 executives, sales would be expected to decline 17 percent if advertising were omitted for one year.—Dr. Daniel Starch, *Advertising & Selling*.

Small gas plants and arrival of natural gas

By H. M. KOPP

General Engineer
The Connecticut Light & Power Co.
Waterbury, Conn.

It would seem to the writer that plants supplying less than 5,000 customers and with a maximum day of less than 1,000 Mcf fall in the category of "small gas plants." Certainly plants over this size have a better chance of competing and also can take advantage of new equipment and apparatus to hold down fuel and labor costs.

Most of the statistical information used has been obtained from operators throughout New England who filled out a questionnaire sent them around the first of the year. My own direct contact is with three small gas plants in the C.L.&P. system. Two other small plants were connected to pipeline supply from the New Haven Coke works and shut down early in the '30's.

Considering the three small operating gas plants with about 2,000 customers each in the C.L.&P. system over the period from 1940 to 1948, the following facts should be noted:

The number of customers has increased by 32.8 percent; average yearly sendout has increased by 51 percent; maximum day sendout has increased by 58.3 percent.

Average production cost per Mcf has gone from 58.7 cents in 1940 to 99.30 cents in 1948, an increase of 69.1 percent; average net fuel cost per Mcf has risen from 27.73 cents in 1940 to 54.84 cents in 1948, a rise of 97.8 percent.

Average conversion cost (operating labor plus supplies and expenses exclusive of fuel) per Mcf has increased from 18.82 cents in 1940 to 29.65 cents in 1948, an increase of 57.5 percent.

Throughout the above period, in order to provide capacity for increased loads, replace obsolete equipment and make changes to improve efficiency and operation, the following apparatus was installed or on order at the end of 1948:

Four generator shells and linings changed from 4' to 5' O.D.	\$10,000
Two generator shells and linings changed from 5' to 6' O.D.	6,000
Three new higher pressure blowers	8,000
Plant piping increased in size and rerouted	5,000
Changes to fuel handling, operating floors and building changes for better ventilation	10,000
Four new purifier boxes with crane and a Blaw-Knox Scrubber are now being erected	50,000
Aftercooler and tar separator at	5,000
Miscellaneous small additions 1940-1948	7,000

Approx. capital expenditure for three small plants, 1940-1948 \$101,000

These additions and replacements were barely enough to keep the plants in good running order and carry current loads. All three plants need additional generating equipment and auxiliary apparatus as most of the present equipment is more than 40 years old. To completely rebuild the three water gas plants would cost in the neighborhood of \$650,000, a questionable expenditure at present earning capacities.

Changing the three plants to propane-air would cost about \$270,000 plus a customer changeover expense of approximately \$260,000—due largely to the fact that a large number of appliances on lines would have to be replaced. Again, this does not appear to offer a solution.

The accompanying graph shows a set of production cost curves for a typical small plant in the C.L.&P. system over the period from 1938 to 1948. Other plants reporting on the questionnaire would follow these costs very closely.

It is interesting to note that the total production cost per Mcf rose gradually from 58.7 cents in 1938 to 72.10 cents

in 1945, but very abruptly from 1945 to reach almost \$1.00 in 1948. The increased costs in 1940 and 1944 reflect extraordinary maintenance. One of the major difficulties with small plant operation is the small divisor for gas make to apply against large items of maintenance. For instance, in 1940 an expenditure of about \$3,500 for extraordinary maintenance increased the maintenance cost by seven cents per Mcf and in 1944 an expenditure of about \$5,500 for extraordinary maintenance increased the maintenance cost by about eight cents per Mcf. We are all aware that at today's level of costs very little work can be done for \$5,000, and with a divisor such as we have in the small gas plants the unit costs will be greatly increased by such an expenditure.

Other small gas plants

Now let us look at nine other representative small gas plants in New England and see how they compare. Of these plants, four have changed over to LP-air during this period. Taking the average of plants which have not changed to LP between 1940 and 1948:

The number of customers has increased by 25.3 percent.

The average yearly S.O. has increased by 44.9 percent.

The maximum daily S.O. has increased by 53.5 percent.

Average production cost has increased from 65 cents per Mcf in 1940 to \$1.10 per Mcf in 1948—an increase of 69.3 percent.

Average fuel cost per Mcf 37 cents in 1940 to 67 cents in 1948, an increase of 81.3 percent.

Average conversion cost has increased 48 percent.

Plants in the survey that have changed over to propane-air during the nine-year period cannot be readily compared as to increase of sendout or operating costs because of the changes in plant operation, also since in many cases the Btu of the delivered gas was increased. Those plants changing to LP-air have found a great reduction in plant operating labor but the increase in fuel cost over the 1940-1948 period has been comparable with that in water gas plants.

Many difficulties are encountered in the distribution system and on customers' premises following a change over to LP-air. If the system is old, the leakage at joints will increase materially but can be helped to some extent by anti-

Presented at A. G. A. Production and Chemical Conference in New York, N. Y., May 23-25, 1949.

leak treatment. Certain appliances are sure to give trouble for a considerable period after being adjusted for new gas.

These points are mentioned not as against the use of LP-gas but because to the mind of the writer, serious consideration should be given before this change should be made if the property is near any probable route for a natural gas pipeline that may be built within five years. In other words, it is not economical to change appliances twice within a short span of years.

The brief survey made of the New England plants indicates that they are doing a very good job of operating in spite of the handicaps of high labor and fuel costs. Many are faced with the problem of replacing obsolete and worn out equipment, however, which will adversely affect costs and earnings.

Much of the program now being carried out in the C.L.&P. small gas properties undoubtedly can be applied to many other situations.

(1) In the northern areas, the sales program and rates for househeating should be such that the peak day will not be built up and cause an excessive investment in plant and distribution capacity.

(2) Generator shells can usually be increased in size by about one foot with-

out undue cost. This should increase set capacity by 25 to 50 percent.

(3) Within reasonable limits, higher pressure blowers can be installed.

(4) Usually bottlenecks in set piping and take-off mains to condensers can be removed at small cost.

(5) In some locations good cold water artesian wells can be obtained for better condensing. This will increase capacity of condensers and lines as well as reduce drip pumping on distribution system.

(6) Purifier boxes are often under capacity and costs of purification are excessive. It may be possible to introduce anhydrous ammonia to increase life of oxide in boxes and reduce cost of purification. Due to high labor costs, it may often prove advisable to completely foul each batch of oxide with the first use and not try to revivify.

(7) Undersized tar separators may have their operation improved by use of some of the so-called wetting agents. Also, it may be possible to add a small screen and shaving filter over the outlet pipe which can be readily changed.

(8) Water gas tar may in many cases be burned over a coal fire under boilers without complete dehydration and with some economy.

(9) Some capacity increase may be obtained by going to shorter cycles but

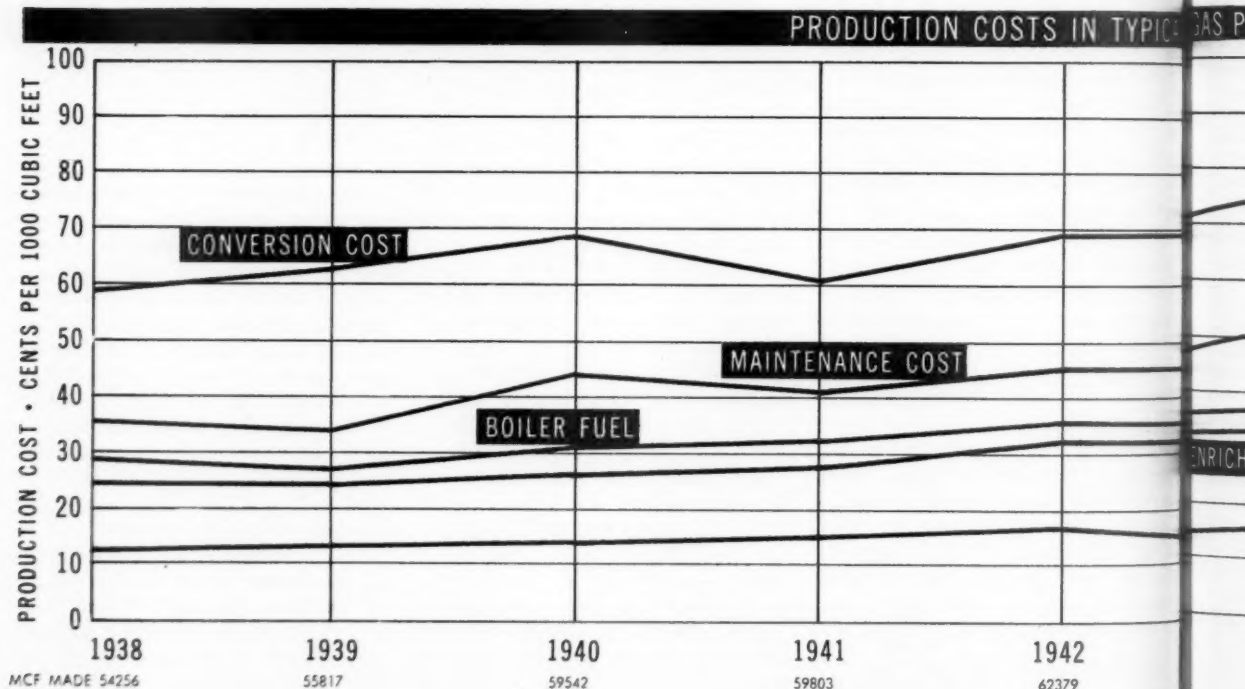
as most small sets are hand-operated, this cannot be carried too far.

(10) When limit of set capacities is reached, it probably will be economical to install one or more propane tanks and use this LP-gas for reforming and cold enriching in the set. Such installations at a cost of from \$10,000 to \$25,000 should enable the operator to increase set output by 20 to 30 percent.

It does not seem necessary to add air-mixing equipment in a small plant since the additional gas can be obtained by blow purge, blow run, and cold enriching by manual operation. Reforming through the generator with the down-run steam will serve to control gravity and reduce the cost of making peak gas.

(11) If a small plant is faced with shortage of holder capacity thought should be given to installation of high pressure storage and small automatically-operated compressors for filling. Later, with natural gas this high pressure storage may come in very handy in case of temporary pipe line failure. Where plants have converted to LP-air, it might prove economical to install high pressure storage and abandon the low pressure holders to save heating and maintenance costs.

(12) The new catalytic cracking plants may be developed to a point and



reduced in cost so that they can be applied to small gas properties, but more experimental work needs to be done.

The efficiency and cost of various enriching and generator fuels has been purposely omitted. The best and most economical fuel to use is governed largely by the location of the plant and the fuel-handling facilities. In most cases the heavy residuum oils are not economical to use in small plants due to cost of additional equipment and facilities as well as handling costs, particularly in cold weather. Many small plants are already using soft coal either 100 percent or mixed with coke. With the improved grades of broken bituminous coal again available, the use of this material for generator fuel should be studied by each company.

Look at the natural gas picture, particularly in the Northeastern States and New England. There is no question but that natural gas would be the salvation of many small gas properties if it could be delivered economically to their systems. It would appear to the writer, however, that this gas would have to be distributed undiluted and not used as an enriching agent as would be possible in large plants. The cost of maintaining any kind of standby plant in a small

situation might take away all of the savings expected from natural gas.

With a reasonable amount of gas storage and arrangements whereby industrial use can be curtailed during peak load periods or short interruptions of supply from line breaks, it seems that small properties will have to be operated in this way. In connected systems serving several territories, the large plants, with standby equipment, would have to release some of their natural gas to the smaller distributing systems during peak periods and emergencies.

Undoubtedly, many small gas companies are going to be disappointed in a supply of natural gas for many years to come. At present costs in most of the New England area, a six-inch high pressure steel pipe will average about \$20,000 per mile.

Assuming that the small plant is 20 miles from the main line with only scattered territory along the route and no large cities beyond, then the investment for a line would be \$400,000 or about \$50,000 per year carrying charges. With a present S.O. of 100,000 Mcf 530 Btu gas and assuming natural gas loads can be increased to 100,000 Mcf of 1,000 Btu, the carrying charges alone would be 50 cents per Mcf. Adding the cost in New England of approximately the

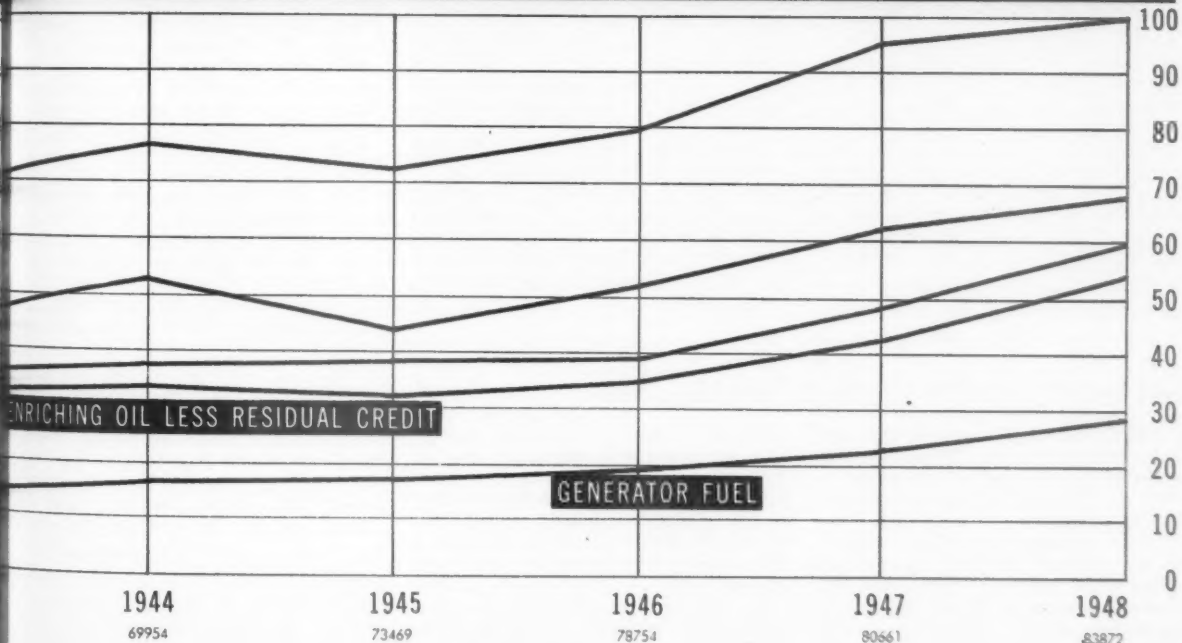
same amount for the gas, this becomes \$1.00 per Mcf. This gas cost plus an estimated \$15.00 per customer for appliance changeover expense is not necessarily attractive.

To put the picture a little differently, it is not possible to tie many of the small companies with the natural gas lines on a sound financial basis particularly in New England which is around 1,500 miles from the source of supply.

In those situations where LP-air plants have already been substituted, economical operation is tied closely with the price of propane or butane which is a premium fuel. Plants which have recently converted to LP-air may find that they cannot afford the investment and plant write-off necessary for a long connecting line to the natural gas main transmission system and absorb the charge for appliance changes at least until a few years have elapsed.

Much progress is being made experimentally with various catalytic cracking processes and high Btu operation. These operations should be watched carefully for possible development of a low priced unit which will make gas which can be substituted for the gas presently distributed without a large investment for appliance changeover and which will employ relatively low-priced fuels as feed stock.

GAS PLANT IN CL & P CO. SYSTEM



Industry news

Officers named by radio advisory groups

NEWLY ELECTED OFFICERS have been announced for two frequency coordinating organizations which will play a major role in advising gas company users of mobile radio service in the selection of unimpaired frequencies. Details of the elections have been provided by Warren T. Bulla, Natural Gas Pipeline Co. of America, Chicago, as vice-chairman, American Gas Association Mobile Radio Committee in the absence of E. M. Borger, president, The Peoples Natural Gas Co., Pittsburgh, chairman.

Following a recent order by Federal Com-

munications Commission, long-haul natural gas systems having no major distribution properties will be assigned radio frequencies in the petroleum service category. On the other hand, gas companies having primarily distribution properties will be provided frequencies in the power utilities service category.

M. V. Patterson has been elected chairman, National Committee for Utilities Radio, an engineering committee established to work jointly with the FCC staff on mobile radio problems. J. G. McKinley, has been elected vice-chairman and Dale Schreiner, secretary.

H. A. Rhodes has been elected chairman of the newly-initiated National Petroleum Radio Frequency Coordinating Association. Mr. Bulla has been elected vice-chairman and W. G. McLarry, secretary-treasurer.

Following is a list of regional chairmen for the new petroleum group together with the territories in which they will operate.

Region 1—W. A. Shipman, United Fuel Gas Co., Charleston, W. Va., chairman (Maine, Vermont, New Hampshire, Massachusetts, Rhode Island, Connecticut, New York, New Jersey, Pennsylvania, Delaware, Maryland, Virginia and West Virginia).

Region 2—J. D. McCullough, Buckeye Pipe Line Co., Lima, Ohio, chairman (Ohio, Kentucky, Indiana, Illinois, Michigan and Wisconsin).

Region 3—L. C. Bomar, Southern Natural Gas Co., Birmingham, Ala., chairman (North Carolina, South Carolina, Tennessee, Ala-

bama, Georgia and Florida).

Region 4—R. S. Caplan, Gulf Refining Co., H. P. L. Division, Houston, Texas, chairman (Texas, Arkansas, Louisiana and Mississippi).

Region 5—W. T. Born, Amerada Petroleum Co., Tulsa, Okla., chairman (Oklahoma, Kansas, Nebraska, South Dakota, North Dakota, Minnesota, Iowa and Missouri).

Region 6—K. S. Hagius, Colorado Interstate Gas Co., Colorado Springs, Colo., chairman (Montana, Wyoming, Colorado, Utah and New Mexico).

Region 7—J. A. Polhemus, Jr., Standard Oil Co. of California, San Francisco, Calif., chairman (Washington, Oregon, Idaho, Nevada, California and Arizona).

Industry, which is familiar with operations of a large number of companies and with the problems involved in congested areas such as the Great Lakes region and the Texas-Louisiana gulf coast region, is endeavoring to work out a national pattern of suggested frequency assignments to aid and assist the FCC. Allocation of frequencies in some instances may not be available until July 1950 due to the present occupancy of these frequencies by other services. It is expected, therefore, that the next 12 months will be a period of transition.

Further details of frequency assignments will be worked out at a forthcoming meeting of the A. G. A. Mobile Radio Committee followed by meetings with the petroleum and power utility groups.

Tests probe accuracy of pilot metering

A recent investigation conducted at The Brooklyn Union Gas Company for American Gas Association Committee on Comparison of Competitive Services has provided valuable data concerning registration of five-lt. tin meters at very low rates of gas flow, such as that of a range-top burner pilot. Tests were sponsored by A. G. A. Subcommittee on Fuel Usage Factors, Leo Loeb, president, Loeb & Eames, New York, chairman.

In general, the tests indicate that five-lt. tin meters, at 0.5 cubic feet per hour, register with an average accuracy of 5.7 percent slow. At rates lower than 0.5 cubic feet per hour, the average registration is increasingly inaccurate—28 percent slow at 0.25 cubic feet per hour and 39 percent slow at 0.15 cubic feet per hour.

The average figures of 28 percent and 39

percent are to a very considerable extent caused by some meters that did not register at all. In the tests run at 0.25 cubic feet per hour, one (new) meter did not register. In the tests run at 0.15 cubic feet per hour, three meters did not register.

It was shown that the accuracy of individual meters varies widely at very low rates of flow, and also that the age of each meter appears to have no significant bearing on its accuracy.

Results are based on the operation of only eight meters, but show, however, an increasingly slow rate of registration as the flow of gas decreases, and also give an indication of the magnitude of error. At the start of each test, the accuracy of each meter was determined by comparison with the registration of a 0.1 cubic-foot capacity wet meter.

Of the eight five-lt. tin meters used in the investigation, two were new, two were repaired, two were seven-years old, non-repaired, and two three-years old, non-repaired. These meters were manifold with gas under laboratory conditions. Next, a single, suitable pilot burner was connected to the outlet of each meter with a "B" cock and gum type gas filter. In addition, a large gum type filter was placed in the main gas line supplying all the meters.

Tests at consumptions representative of range top burner pilots, namely 0.15, 0.25 and 0.5 cubic feet per hour, were made with gas averaging 0.7 specific gravity. Each of these tests was made twice, first for a total of 0.5 cubic feet of gas, then extended tests of 500-600 hours. No corrections were made for temperature and barometric pressures.

Gas utility accident rates fall in 1948

A DROP OF 8.8 percent in disabling injuries per million man-hours of exposure was established by the American gas utility industry in 1948, the first drop in frequency rate over a preceding year since 1943. These and other interesting facts are contained in the latest issue of "Accident Experience of the Gas Utility Industry in 1948" which was distributed to member companies of the Association last month.

Prepared by American Gas Association

Bureau of Statistics for A. G. A. Accident Prevention Committee, the booklet sets the 1948 frequency rate of disabling injuries per million man-hours of exposure at 19.93. The number of disabling injuries per 100 employees was 4.18, a decline of 8.1 percent compared with the corresponding rate of 4.55 reported in 1947.

The 1948 severity rate for the gas utility industry was 13.3 percent lower when contrasted with the 1947 severity rate. During

1948 there were 1.11 days charged to disabling industries per 6000 hours worked. The number of days charged to disabling injuries per 100 employees was 233.5 in 1948, or 32.1 days less than during the previous year. This is equivalent to a 12.1 percent decline.

Additional copies of the accident booklet can be obtained by writing to Bureau of Statistics, American Gas Association, 420 Lexington Ave., New York 17, N. Y.

Supreme Court rules on reserves disposal

IN A SIGNIFICANT DECISION on June 20, the U. S. Supreme Court ruled that Federal Power Commission has no control over the way a natural gas company disposes of its gas reserves. The ruling upheld a decision by United States Circuit Court in Philadelphia in a case involving Panhandle Eastern Pipe Line Co., Kansas City, Missouri.

Panhandle Eastern had decided to transfer gas production leases on 96,000 acres of its gas reserves in Kansas to Hugoton Production Co., organized by Panhandle Eastern under Delaware laws. The leases were transferred to Hugoton in exchange for that company's entire capital stock.

FPC sought to intervene in the transaction,

and when Panhandle Eastern resisted, the commission asked United States District Court in Delaware to order a halt, pending study of the plan. The District Court refused the request and was upheld by the Circuit Court in Philadelphia. The commission then asked for a high court review.

The Supreme Court's ruling was by a five-to-three vote with Justice Reed delivering the decision and Justice Black writing the dissent.

Justices Rutledge and Douglas also dissented. Justice Murphy abstained.

Justice Reed said that Congress clearly showed that it did not intend to give the commission power over sale of gas reserves.

He added that the commission for ten years never had made such a claim of authority.

"Failure to use such an important power for so long a time indicates to us," Justice Reed said, "that the commission did not believe the power existed."

"In the light of that history we should not, by an extravagant, even if abstractly possible, mode of interpretation, push powers granted over transportation and rates so as to include production."

Justice Black's dissent called the majority opinion a "sterilizing interpretation" which he said goes far toward scuttling the Natural Gas Act.

Cincinnati completing improvement program

A COMPLETE PROGRAM of expanding and improving facilities to provide better service for customers is well under way at The Cincinnati Gas & Electric Company. All operations and improvements within the utility are patterned along the line of the company's slogan, "Gas and Electricity—AT YOUR SERVICE."

The huge first-floor lobby of the building recently underwent a complete remodeling program and today represents one of the most complete and attractive display areas in the Middle-West. Another section of the building, quartering the home service and home lighting departments, has been completely remodeled and equipped with the most modern and scientific fixtures. Nearly all of the attractive first-floor exhibits are designed to assist local appliance dealers and the gas and electric industry as a whole.

Recent displays which have attracted thousands of visitors to the utility building include a "Dishwashing Derby," featuring automatic dishwashers and water heaters, a "Television Show," and at present a "Queen of Leisure On Washday" contest in which modern home laundry equipment is stressed.

These first floor displays are changed each month, thus enabling the company to present to the public the latest devices available that affect their gas and electric service.

Along one side of the first-floor lobby are two kitchens and a laundry exhibit in which appliances are changed every few weeks. The entire lobby is air-conditioned and illuminated with modern high-intensity lighting equipment. The other side of the lobby has been renovated to provide better facilities for persons applying for service. A unique arrangement of desks provides more space and glass enclosures, also more privacy.

Huge display windows make it possible for persons passing the building on the outside to view the exhibits and activities within the lobby.

The two kitchens are the last word in efficiency and beauty. A complete freezing assembly has been included on one wall. A special feature is the meter panel which includes a pyrometer, a gas manometer, a regulator, two gas meters and a hot water meter. Piping and wiring are built into the panel between two ranges to form a decorative



Home service department's New Freedom Gas Kitchen which is the last word in efficiency and beauty



Modern new cashiers' section on remodeled first floor of The Cincinnati Gas & Electric building

tion. The laundry is equipped with an automatic washer and gas dryer.

Every appliance is metered. To provide a dining space or room for a small audience a circular enclosure is formed by draperies. When closed they make a quiet office and privacy in the kitchen. Sound-proof ceilings and air-conditioning add to the comfort of these offices and kitchens.

In an effort to acquaint as many persons as possible with the new facilities, the home service department, under the direction of Mary Belle Burnett, has been doing extensive

entertaining—a luncheon for the executives, a luncheon for women of the press, open house for gas and electric sales representatives, builders, contractors, women employees of the company, and dinners for small groups of home economics teachers.

A great increase in requests for help in kitchen planning has been noted since the quarters were opened to the public. Space has been provided to offer this service on a modest scale by one of the home economists who draws few plans but helps many on a consultant basis.

PUAA convention selects advertising winners

ADVERTISING trends, techniques and programs were in the national spotlight last month at the twenty-eighth annual convention of Public Utilities Advertising Association, June 20 and 21 and Hotel Netherland Plaza in Cincinnati, Ohio. More than 200 advertising executives, predominantly from the gas and electric industries, attended the meeting which included an impressive display of current advertising and public relations samples.

Floyd L. Fairman, Kentucky Utilities Co., was elected president of the association to succeed Herbert Briggs, Jr., Philadelphia Co., Pittsburgh, who presided at the convention. Other newly elected officers are: first vice-president—William B. Hewson, The Brooklyn Union Gas Co.; second vice-president—John E. Canfield, Wisconsin Power & Light Co.; third vice-president—Paul L. Penfield, Detroit Edison Company. Charles D. Lyon, Potomac Edison Co., and Mead Schenck, Interstate Power Co., were re-elected secretary and treasurer, respectively.

A feature of the opening day's program was a luncheon sponsored by the host company, The Cincinnati Gas & Electric Co., at which Walter C. Beckjord, president, welcomed the visitors. "Television for Utilities" was a major topic which evoked extended discussion from the floor and brought out the widening interest in this fast-growing medium. Utility practice was outlined in a "hellbox" session with Jack Spaulding, Southern California Gas Co.; Harold Beeby, Commonwealth Edison Co., and Richard Shannon, Detroit Edison Co., leading the discussion.

Of special interest at the Tuesday meeting were reports on compensation of advertising personnel, presented by James E. Humphreys, The Ohio Fuel Gas Co., and on utility advertising expenditures, presented by Henry Obermeyer, Consolidated Edison Co. of New York, Inc., in the absence of the committee chairman, Clarence L. Law.

During 1948, Mr. Obermeyer reported, gas companies spent 56 cents per customer on advertising; combination companies, 57 cents; and electric companies, 82 cents. Expressed as a percentage of gross revenue for the same period, however, the picture changes, with gas companies spending 0.79 percent; combination companies, 0.54 percent; and electric companies, 0.62 percent.

Highlight of the convention was the presentation of the annual Better Copy Contest Awards which focussed attention on the outstanding advertisements and public relations media of the past year. Competing companies were divided into three groups: A—less than 125,000 customers; B—125,000 to 300,000 customers; C—more than 300,000 customers.

The Cincinnati Gas & Electric Co. won three first-place and two second-place awards to lead all others in classifications which included gas industry material. Winners of two first-place awards with gas industry entries included New Orleans Public Service, Inc., with three second-place winners; Houston Natural Gas Corp., with one second-place award; The Peoples Natural Gas Co., Pittsburgh, with one second-place award; and

Lynn Gas & Electric Co., Lynn, Massachusetts. The Peoples Gas Light & Coke Co., Chicago, registered two second-place winners and a number of other gas utilities won second- and third-place honors.

Winners of first-place awards in the various classifications which included gas industry entries were as follows:

Series of public relations advertisements—Lynn Gas & Electric Co.; Oklahoma Natural Gas Co.; The Cincinnati Gas & Electric Company.

Series of gas promotional advertisements—Illinois Northern Utilities Co.; San Diego Gas & Electric Co.; Public Service Co. of Northern Illinois.

Single gas company advertisements on any



subject—Houston Natural Gas Corp.; The Peoples Natural Gas Co.; Lone Star Gas Company.

Bill enclosures, direct mail pieces, residential (all utility companies)—Lynn Gas & Electric Co.; The East Ohio Gas Company. *Bill enclosures, direct mail pieces, industrial and commercial (all utility companies)*—New Orleans Public Service Inc.; Philadelphia Electric Company.

Special employee booklets, pamphlets (all utility companies)—New Orleans Public Service Inc.; Consolidated Edison Co. of New York, Inc.

Window display (all utility companies)—Houston Natural Gas Corp.; The Peoples Natural Gas Co., Pittsburgh. (Continued)

MOM SAYS
I LOOK LIKE AN
ANGEL WHEN
I'M CLEANED UP
('BOUT FIVE TIMES
A DAY) IT'S
SURE LUCKY
WE GOT A BIG
AUTOMATIC
NATURAL
GAS WATER
HEATER SO IT'S EASY
TO WASH ME
AND THE CLOTHES

Bathrooms	Bedrooms	Minimum Capacity
1	1 or 2	30 gallons
1	3 or 4	40 gallons
2	2 or 3	40 gallons
2	4 or 5	50 gallons
3	3	50 gallons
3 or 4	4 or 5	75 gallons

Sizes recommended by Pacific Coast Gas Association

SAN DIEGO GAS & ELECTRIC COMPANY

Owned by over 14,000 investors, most of whom live in California

Gas water heating advertisement which won a first-place award for San Diego Gas & Electric Co.

Interior display (all utility companies)—Central Illinois Electric & Gas Co., Rockford; The Cincinnati Gas & Electric Company.

Outdoor advertising large units (all utility companies)—Citizens Gas & Coke Utility, Indianapolis; Minneapolis Gas Co.; Southern California Gas Company.

Outdoor advertising, small units (all utility companies)—Indiana Gas & Water Co.; Washington Gas Light Co.; Pacific Gas and Electric Company.

Annual report to stockholders (all utility companies)—Iowa Electric Light & Power Company.

Films (all utility companies)—Michigan Consolidated Gas Company.

Complete programs (all utility companies)—The Cincinnati Gas & Electric Company.

Noteworthy was the fact that gas industry entries, competing against all utilities, scored a clean sweep of first-place winners in the outdoor advertising competition for both large and small units. A preponderance of second and third-place winners in this field were also gas industry displays.

Home service book

PLANNING, presentation and dramatization of successful lecture demonstrations are discussed in detail in a new booklet, "The Home Service Demonstration," recently released by American Gas Association. The booklet was prepared by A.G.A. Home Service Committee, Elizabeth J. Lynahan, home service director, The Peoples Gas Light & Coke Co., Chicago, chairman. Gladys B. Price, home service supervisor, Southern California Gas Co., Los Angeles, is the author.

Prepared for distribution to college classes and teachers of high school economics, the contents were adapted for school use from the demonstration techniques section of another A.G.A. booklet, "Home Service Serves the Community." Easy to read and well-illustrated, "The Home Service Demonstration" sets forth the fundamental value of lecture demonstrations, outlining steps and procedures in staging.

Copies can be obtained at ten cents each from American Gas Association, 420 Lexington Ave., New York 17, N. Y.

Great Lakes group hears personnel plans

A REVIEW OF PLANS for the gas industry's national personnel conference at the Netherland Plaza Hotel in Cincinnati on November 28 and 29 and a featured address on current labor legislation headed the agenda during the Great Lakes personnel conference in Chicago last month. Sponsored by American Gas Association, the meeting was attended by 15 gas industry executives representing 11 companies in the Great Lakes area.

L. A. Brandt, The Peoples Gas Light & Coke Co., Chicago, and chairman, A. G. A. Personnel Committee, briefly reviewed the

Ebasco holds second safety seminar



Some of the members and faculty of Ebasco seminar: (Left to right, front row) Dr. W. A. Cutter, New York University; C. K. Shelton, Texas Electric Service Co.; C. Van Wickler, Long Island Lighting Co.; R. L. Conway, Jr., United Gas Pipe Line Co.; Dr. H. J. Stack, NYU; (second row) W. T. Rogers, Ebasco; E. V. Olson, The Washington Water Power Co.; W. Easton, The Cincinnati Gas & Electric Co.; W. Ismay, Central Arizona Light and Power Co.; V. A. Howell, Long Island Lighting Co.; (rear row) M. Castro, Compania Cuba de Electricidad; V. R. Womeldorff, Illinois Power Co.; L. E. Haughey, Jr., Ebasco International; E. P. Matheson, Companhia Auxiliar De Empresas Electricas Brasileiras; C. D. Murdock, Kansas City Power & Light Company. Modern accident prevention techniques were featured

A SECOND SEMINAR in public utility safety was held June 13-24 by Ebasco Services Inc., New York, in cooperation with New York University. The first seminar of this type, held earlier this year, proved so successful that the program was repeated for personnel unable to attend the first session.

Contents of the course were designed specifically to teach safety and operating personnel of utilities the most modern practices and techniques in accident prevention and to acquaint them with latest developments.

Featured at the second seminar was a new course on supervisory techniques, by Dr. Walter A. Cutter, based on the book "Formula for Supervision, 1949" by H. W. Heinrich. Dr. Cutter interpreted the material of the book in terms of public utility supervision and accident prevention.

Other classes included effective speaking, effective relations, conference leadership and safety training, utility safety programs, motor vehicle safety, visual aids and fire prevention and protection.

Field trips also included visits to the training school of New York Telephone Company at Long Island City and to the Waterside

Plant and fire protection school, Consolidated Edison Co. of New York, Inc. The association panel, a unique feature of the seminar, was held at headquarters of American Gas Association. Representatives of the accident prevention activities of American Gas Association, Edison Electric Institute, American Transit Association, American Institute of Electrical Engineers, American Society of Safety Engineers and the National Safety Council, outlined the work of their respective associations in the field of safety and answered questions of the seminar group.

Courses at the University were under the auspices of the department of general education and were conducted by Dr. Herbert J. Stack, professor of education and director of the center for safety education, and his assistant, Dr. Walter A. Cutter, assistant professor of industrial safety. Assisting were Professor Milton D. Kramer and Dr. Dawson F. Dean.

Ebasco sessions were conducted by G. G. Blair, fire protection engineer and W. T. Rogers, safety consultant insurance department. The entire seminar was directed by the Ebasco safety consultant.

Congress on the Wage and Hour Law, and some recent decisions under the present law.

Time and place of the next meeting of the Great Lakes Personnel Conference was discussed. Members agreed that time should be set aside during the national personnel sessions for a meeting of each of the three A. G. A. regional personnel conferences.

Tom E. Hayes, Milwaukee Gas Light Co., Great Lakes vice-chairman, presided at the Chicago meeting in the absence of the chairman, Elmer L. Ramsey, The Laclede Gas Light Co., St. Louis, Missouri.

Utility group studying report simplification

A SPECIAL COMMITTEE of gas and electric industry representatives will meet July 10, 1949 and again in August and September to consider suggestions from the industry for simplifying and eliminating unnecessary duplication of gas and electric company reports to the Securities and Exchange Commission.

W. G. Bourne, Jr., vice-president, The Commonwealth and Southern Corp., is chair-

man of the industry committee which was appointed recently by Advisory Council on Federal Reports, a council created by authority of the Director of the Federal Budget to assist him in his statutory duty of passing on all reports by industrial and business enterprises to Governmental agencies. Following its meetings this summer, the industry committee will submit recommendations to S.E.C. through the

U.S. Budget Bureau.

Other members of the committee are: Douglas Tonge, American Gas and Electric Co.; Theodore G. Sommerman, Ebasco Services Inc.; Alfred E. Softy, The Commonwealth and Southern Corp.; William Storz, Philadelphia Electric Co.; E. H. Gannon, Stone & Webster Service Corp., and H. C. Hasbrouck, Edison Electric Institute, secretary.

First gas-turbine plant

WHAT IS ALMOST CERTAIN to be the first gas turbine producing power commercially on a U. S. utility system has been purchased by Oklahoma Gas & Electric Company and installed near Oklahoma City. The novel power plant was built by General Electric Company in Schenectady.

Extensive studies show an abundance of low-cost, high-Btu natural gas and favorable conditions for working the gas turbine into the existing plant heat balance.

In principle, the gas turbine is a land-bound jet engine. Like the jet, fuel burns in a combustion-chamber producing gases that expand rapidly. Then hot gases blast through a turbine wheel to make spinning power. The big difference is that in a jet engine some of the energy from the change in pressure of the gases is used to drive the engine forward, whereas in the gas turbine hot gases spin a wheel, give off heat. Another difference is the jet burns kerosene; the new gas turbine engine runs on natural gas.

Cathodic protection

RESEARCH INFORMATION which should prove helpful in furthering efforts for a reasonable standardization of anode-tank installations of hot water heaters is provided in a new bulletin published by The Cleveland Heater Co., Cleveland, Ohio. Prepared by D. J. Fergus, research engineer, the bulletin is entitled "Cathodic Protection of Galvanized Hot Water Storage Tanks by Use of Galvanic Magnesium Alloy Anodes."

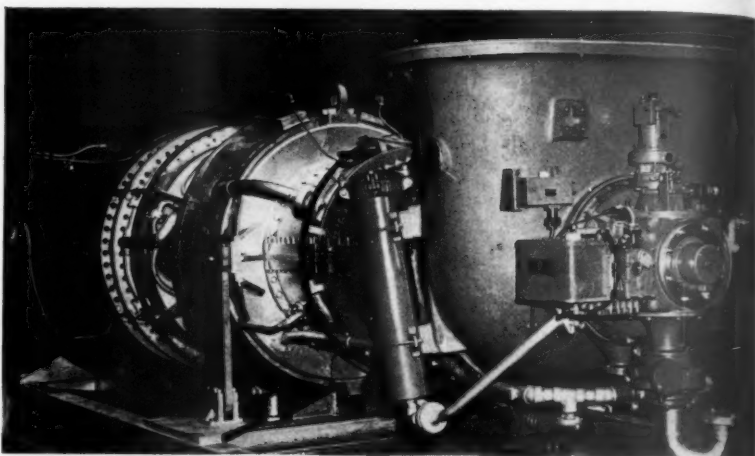
Research on this subject was sponsored by The Cleveland Heater Company at Case Institute of Technology. The author was assisted by Dr. Carl F. Prutton and Dr. R. C. West, Case Institute.

Previous experimental work on magnesium alloy hot water storage tank anodes employed only Cleveland tap water in the initial investigation, the author states. In order to better evaluate this method of corrosion prevention for wide commercial use, tests were conducted that are representative of the different potable waters found generally throughout the country. The investigation concentrated on the more corrosive type waters.

Copies of the pamphlet can be obtained at 25 cents each from The Cleveland Heater Co., 2310 Superior Avenue, N.E., Cleveland 14.

Ideals

● Ideals are to run races with. The moment we stop chasing them they sit down and become opinions.—*Lutheran*



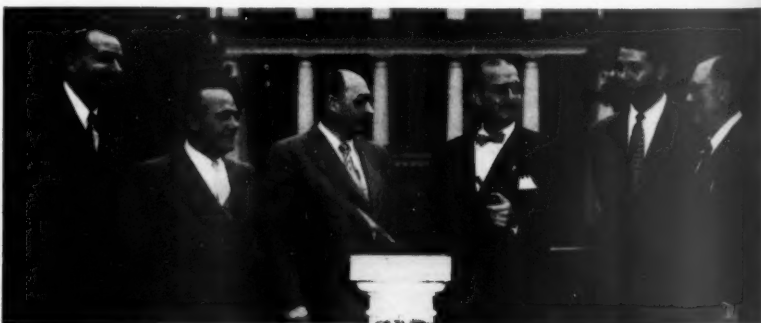
Close-up of powerful new gas turbine power plant purchased by Oklahoma Gas & Electric Company

Hartford guest to home economists



Head table at The Hartford Gas Company's annual conference for home economics teachers in the Greater Hartford (Conn.) area. More than 150 guests heard talks by business and educational leaders

Midwest industrial group meets



Group at Midwest Industrial Gas Council spring conference: (Left to right) Paul F. Gibson, secretary-treasurer; Fred Utterback, vice-chairman; Bert H. Roberts, chairman; A. W. Conover, North Shore Gas Co.; Robert Angley, Continental Industrial Engineers; L. W. Tuttle, Public Service Co. of Northern Illinois

Brooklyn opens theater cooking school

ANOTHER PRE-WAR ACTIVITY of The Brooklyn Union Gas Company's customer-relations program was revived recently when the home service department dusted off its theater make-up kits and took their cooking demonstrations out on the road. First major stop-over was a local theater in Queens where the utility conducted a six-week cooking school with ten food and equipment manufacturers participating.

A record crowd of 600 patrons attended the first showing, compared with a pre-war audience of 40 people. According to Ruth Soule, home service director, the public relations value of the cooking school should be great.

Classes were run on six consecutive Thursdays at noon for an hour before the regular screen performance. Grand prizes included a deluxe automatic gas range, an automatic gas water heater and sets of modern aluminum ware.

Stage sets were built by the display studio of the utility; stage properties including cooking equipment and food were supplied by

the participating manufacturers; publicity was handled by the utility and the theater.

The stage setting—in effect a modern gas kitchen flanked with decorative side flaps—incorporated on the one rolling platform a gas range, a gas refrigerator, and kitchen cabinets. A gas line was led out to stage-center and connected with flexible tubing to the gas range through a curtain backdrop. At the end of each performance, the entire set is rolled off-stage in a few seconds.

Both the gas company and the theater took care of publicity within their own business spheres, and coordinated on certain other phases of advertising and display. Brooklyn Union printed 50,000 heralds announcing the school, 20,000 of which were enclosed in April bills of customers in the vicinity of the theater. The remainder were distributed jointly by the theater and the utility. The gas company's display studio also placed an exhibit in the lobby of the theater two weeks before opening day.

The theater demonstrations are designed to



An early patron reads poster outside theater announcing Brooklyn utility's cooking school

supplement the utility's regular weekly cooking classes on its own premises. The first theater cooking school was so successful that a follow-up in the fall is considered.

Tin for meters returned to prewar weight

TIN AND ANTIMONY SECTION, U. S. Department of Commerce, which administers tin order M-43, has amended this order effective June 2, 1949, bringing the weight of tin plate for gas meters up to prewar standard.

Restrictions on meter tin during the war made it necessary for meter manufacturers to accept tin plate of 3.30 pounds per base box. The new order lifts the weight of tin plate to six pounds

per base box. In addition, tin for use in solder has been raised from 50 to 60 percent.

The bill extending the life of tin allocation procedure passed the House and Senate and was signed by the President on June 30, 1949.

Arguments in the case for heavier tin plate for gas meters were set up by A.G.A. Committee on Meters and Metering under the chairmanship of R. J. Ott, The Philadelphia Gas

Works Co., Philadelphia, Pa., and were presented before the Tin Allocations Unit of the Department of Commerce by George H. Smith, A. G. A. assistant managing director.

The committee's study emphasized the fact that use of thin tin plate shortens the life of tin gas meters by approximately ten years and that much of the tin in gas meters is recovered after use.

Revenues, sales and customers gain

GAS utility companies registered gains in total revenues from sales, in the number of customers served and in total volume of sales, during the first quarter of 1949 as compared with a year ago, according to an American Gas Association report.

Total revenues from sales of gas by utilities in the first quarter of 1949 were \$535,000,000, an increase of 6.9 percent over the comparable period in 1948. Revenues from industrial sales rose 15 percent, while residential and commercial revenues gained four percent and 11 percent respectively during the period. For the 12 months ended March 31, 1949, total revenues from sales of gas by all utilities were \$1,579,000,000, an increase of nine percent over total revenues of \$1,449,000,000 in the previous 12-month period.

Revenues from sales of natural gas by utilities in the first quarter of this year amounted to \$358 million, a gain of 10.4 percent over the comparable quarter in 1948. For the 12 months ended March 31, 1949, total revenues from natural gas sales were \$1,010,000,000, an increase of 13.1 percent over \$893 million for the same period a year earlier.

Manufactured gas sales revenues in the first

quarter of 1949 were \$145 million, a gain of 4.7 percent over total revenues of \$139 million a year earlier. For 12 months ended March 31, 1949, total manufactured gas sales revenues were \$471 million, a gain of 7.6 percent over a year earlier.

Because of changeovers by several large utility companies to the distribution of straight natural gas, total revenues from the sale of mixed gas during the first quarter of this year declined from \$37 million a year earlier to \$31 million for the current quarter, a drop of about 16 percent. For the 12 months ended March 31, 1949, total mixed gas revenues were \$98 million, a decline of 17.3 percent from a year ago.

The gas utility industry was serving 22,600,000 customers on March 31, 1949, an increase of 3.9 percent over a year earlier. Residential customers totaled 20,800,000, a gain of 3.3 percent over 20,200,000 customers being served on March 31, 1948. Commercial and industrial customers were up 11.6 percent and 3.3 percent respectively. Of the total number of customers served at the end of the first quarter, about 12 million were receiving

natural gas, a gain of 9.3 percent over a year earlier; manufactured gas customers totaled 8,600,000, up about three percent, while mixed gas customers totaled 1,900,000, a decrease of nine percent.

Sales of natural gas during the first quarter of this year were 924 million Mcf, a gain of 10.1 percent over 840 million Mcf sold in the like quarter of 1948. For 12 months ended March 31, 1949, total natural gas sales were 2,907,000,000 Mcf, an increase of 11.7 percent over 2,602,000,000 Mcf sold in the previous 12 months.

Manufactured gas sales by utilities declined slightly in the first quarter of 1949 to a total of 140 million Mcf. For the 12 months ended March 31, 1949, manufactured gas sales were 436 million Mcf, a decrease of 2.8 percent from 449 million Mcf sold in the previous 12 months. Mixed gas sales totaled 46 million Mcf in the first quarter, down 17.2 percent from 56 million Mcf sold in the comparable quarter of 1948. For the 12-month period, mixed gas sales were 137 million Mcf, a decrease of 16.9 percent from 165 million Mcf sold in the previous year.

Oklahoma Natural proves "Gas Has Got It"

USING THE POWERFUL "Gas Has Got It" theme, Oklahoma Natural Gas Company recently embarked on an eight-week statewide utility-dealer cooperative gas range sales campaign in each of the nine areas served by the company. Total attendance of all meetings reached 1,408 dealers, salesmen and gas company representatives.

D. W. Reeves, general sales manager, opened the "kick-off" meeting in each district with a talk stressing the need of returning to old-fashioned competitive selling meth-

ods. M. H. North, advertising and sales promotion director, outlined "54 reasons why gas ranges are best for cooking," slanted to give an intelligent rebuttal to the electric range story.

Mr. North was followed by Mildred R. Clark, home service supervisor, who presented a forceful sales demonstration on the new gas range. Howard W. Jones, advertising manager, then discussed the campaign, describing advertising and sales promotional helps and the merchandise prize plan offered as incentive for gas range sales. Many helps

offered by the home service department to dealers during the campaign, were outlined by local home service directors.

The home service department is promoting a series of gas-range cookery demonstrations each week during the drive, in cooperation with gas range dealers.

Gas range sales are expected to go well over 4,000 ranges during the campaign. As an added stimulus, Oklahoma Natural is offering dealers and salesmen a special prize plan for gas range sales.

An adequate return



THE MAGNET

People generally expect something for their money. About the only way to get them to invest their hard-earned cash in a business is to offer them an adequate return.

Good dividends act like a magnet to attract stockholders. Con Edison must earn enough to pay reasonable dividends to get the new capital required to keep up with the times. We can't borrow it all.

Right now Con Edison is spending millions of dollars a year on new equipment needed to keep pace with the demand for more electricity and gas to run your washing machines, modern ranges, television sets and the many other appliances that make life more pleasant. So, to be sure that New Yorkers will continue to get all the low-cost light, heat and power they want, more and more everyday people must believe that Con Edison stock is a good buy.

With money provided by investors we buy the new, modern equipment needed both to expand service and to make our operations more and more efficient. That is how we can make real savings for you.

So you can see why adequate electric and gas rates are good business for everybody—consumer, employee and investor. They enable us to pay good wages, meet higher costs, and attract investors whose money is needed to expand and improve our service to you.

CONSOLIDATED EDISON SYSTEM

Your best buy—electricity and gas



One of a recent series of advertisements which Consolidated Edison Co. of New York, Inc. has published in metropolitan newspapers to explain the equity capital problem in every-day language

Gas liquefaction, storage plant proposed

CHICAGO DISTRICT PIPELINE COMPANY has applied for authorization to construct and operate a \$6 million plant in Chicago for the liquefaction, storage and regasification of natural gas. A hearing before FPC is scheduled to commence June 21 in Washington, D. C.

The plant, which would have a storage capacity of 400 million cubic feet of gas, would have facilities for liquefying approximately four million cubic feet of gas daily and for regasification and return to the transmission system of six million cubic

feet per hour.

Liquefaction process described in the application involves separation and recovery of butane and propane, removal of nitrogen, and storage of the gas in liquid form at a temperature below boiling point.

The company proposes to offer the storage facilities to its customer companies under a rate schedule based on the cost of service. Construction of the plant would be financed through a loan from Chicago District's parent company, The Peoples Gas Light and Coke Co., Chicago.

Stockpile natural gas

A MEANS of solving the peak-load problem by stockpiling natural methane or natural gas on solid absorbents at reduced temperatures, is described by C. V. Spangler, J. F. Pritchard & Co., Pittsburgh, in the May 5, 1949 issue of *The Oil and Gas Journal*.

Entitled "A New Way to Stock Pile Natural Gas," the article describes a method of storage that can be economically put into

practice as an individual plant system where storage service is needed. Sections of the article are devoted to: the absorbent—Fuller's Earth, the storage system, storage units, safety, and separation of nitrogen from natural gas. Mr. Spangler is also the author of "Solid Adsorption-Type Natural-Gas Dehydration Plants," American Gas Association *Proceedings*, Natural Gas Department, 1946.

East Ohio film cited

ADDITIONAL RECOGNITION for The East Ohio Gas Company's new motion picture film "Our Silent Partner" has been received in the form of an "Oscar" awarded during the annual film festival of the Cleveland Film Council on June 16, 1949. Selected films covering industrial, religious and ed-

ucational fields were reviewed. The East Ohio film was judged best under the classification of public relations.

Fifteen prints of the film have also been requested by U.S. Department of State for use abroad in various U.S. Embassies.

Blodgett introduces new gas stove

A RADICALLY new gas-fired stove for use in bakeries, confectioneries, hotels, restaurants, factory and industrial application has been announced as ready for distribution on July 1 by G. S. Blodgett Co., Burlington, Vermont. The century-old company has, up to the present, been exclusively engaged in the production of ovens.

Before deciding upon the production date, 12 pilot models were installed in as many different applications in Burlington, Boston, New Haven, New York, Chicago, Milwaukee and Los Angeles, for more than a year of

strenuous field testing.

Features claimed for the new stove are: a 24-inch high, square, streamlined body of heavy steel; a two-ring and lid, 22½-inch square, ¾-inch thick machined steel top; a welded steel, three-ring burner with more than 400 stainless steel burner port tips; a stainless steel heat distributor; a constant burning pilot and adjustable legs. The burner, a high speed design, is of the so-called "universal" type, usable with all gases and requiring only an orifice change for high Btu gases.

Gas house heating contest announced

AMERICAN GAS ASSOCIATION has announced its third annual gas house heating progress award of one thousand dollars, in five awards ranging from 50 dollars to 500 dollars in cash, for activities deemed to have made the greatest contribution to the advance of gas house heating during the period, September 1, 1948—September 1, 1949. These awards are sponsored by The Corroaire Heater Corp., Cleveland, Ohio.

Although a large demand for gas house heating still exists in some areas, gas utilities have found when restrictions were lifted that waiting lists have dwindled appreciably. It is evident, therefore, that the time is at hand when active selling and promotion must be done in the house heating field.

The awards are not limited to sales and promotional activities. Any member of a gas utility holding company, or service company

which is a member of A. G. A., or any individual member of the Association, may submit an entry for any outstanding activity in gas heating research, product development, for an address on gas heating or an article published in a gas trade paper. Any other activity contributing in an outstanding degree to the advancement of gas heating will be considered by the Jury of Awards.

Entries must be received at A. G. A. Headquarters, 420 Lexington Avenue, New York 17, N. Y., not later than midnight, September 1, 1949. The Jury of Awards will consist of executive representatives from American Society of Heating and Ventilating Engineers, Gas Appliance Manufacturers Association, A. G. A. Manufactured Gas Department, A. G. A. Natural Gas Department, and an executive to be appointed by the president of

A. G. A. Awards will be presented at the A. G. A. annual convention in Chicago, October 17-20, 1949.

This contest has attracted heavy interest in the past two years and it is expected that increasing supplies of gas and the easing of gas house heating restrictions will result in many additional entries.

Past recipients of awards include: H. P. Morehouse, Public Service Electric & Gas Co., Newark, N. J.; Hall M. Henry, NEGEA Service Corp., Cambridge, Mass. and W. H. Wise, The Peoples Gas Light & Coke Co., Chicago, Ill., in 1947. The 1948 award winners were L. J. Fretwell, Oklahoma Natural Gas Co., Tulsa, Okla.; W. E. Davis, Equitable Gas Co., Pittsburgh, Pa., and R. E. Ginna, Rochester Gas & Electric Corp., Rochester, New York.

Gas industry personnel conference

THE FOURTH ANNUAL PERSONNEL CONFERENCE OF THE GAS INDUSTRY, under the sponsorship of the Personnel Committee of American Gas Association, Midwest Personnel Conference, A.G.A. Great Lakes Personnel Conference, and S.G.A. Personnel Section, will be held in the Netherland Plaza Hotel in Cincinnati on November 28 and 29.

A stimulating and interesting program covering such subjects as supervisory training and executive development, salary administration, pensions, and fringe benefit costs is being planned. In addition, each of the sponsoring groups will devote an entire afternoon to their usual round-table discussion on company developments. Program details will be announced later.

Industrial gas breakfast in October

THE TRADITIONAL Industrial Gas Breakfast sponsored by Industrial and Commercial Gas Section, American Gas Association, will be held on Tuesday morning, October 18, 1949 at 8:30 in the Hollenden Hotel, Cleveland. This popular affair during Metal Show week is designed for editors of publications in the metals field and industrial gas men and is now in its twelfth year. An outstanding speaker will address the assembled

guests on a subject of interest to all.

The breakfast has been moved ahead one day this year because the A. G. A. annual convention is being held the same week. With the breakfast scheduled for Tuesday, industrial gas men will have an opportunity to visit the Metal Show in Cleveland's giant exposition hall, attend the breakfast, and still arrive in Chicago for the Section's Sessions on the following day.

American Light & Traction changes name

STOCKHOLDERS of American Light and Traction Co., Chicago, Ill. voted overwhelmingly at the annual meeting on June 15 to change the company's name to American Natural Gas Company.

It is felt that the new title will more aptly describe the system's new function as an integrated natural gas transmission and dis-

tribution system.

The company, one of the country's oldest utility holding companies, occupies the unique position of never having omitted a dividend on its common stock since the inception of payments on the issue in 1904. William G. Woolfolk, company chairman, presided at the meeting.

Pipe flange supplement

SUPPLEMENT NUMBER 1, "Steel Pipe Flanges and Flanged Fittings" has been published by The American Society of Mechanical Engineers to replace existing American Standard Rating Tables. The supplement was approved by American Standards Association on April 27, 1949.

American Gas Association is represented on ASME's Sectional Committee B16, Standardization of Pipe Flanges and Fittings, by Henry L. Underhill, Shelter Island Heights, New York.

Gas water heater film



Reproductions from new GAMA 35 mm, sound-slide film produced as an aid in presenting proper gas water heater installation methods to dealers and servicemen. The film was produced in the belief that correct and modern installation will materially reduce the cost of automatic gas water heater service, thus creating greater customer satisfaction. Copies can be obtained from Gas Water Heater Division, Gas Appliance Manufacturers Association, 60 East 42 St., New York, N. Y.

Providence advances two gas officials

DONALD WHITCOMB has been appointed general superintendent, Providence Gas Co., Providence, R. I., and John L. Wood has been named engineer of distribution to succeed Mr. Whitcomb.

Mr. Whitcomb, after graduation from Yale University in 1924, worked for about two years as cadet engineer with Public Service Electric & Gas Co., Newark, New Jersey. From 1926 to 1932 he was a construction superintendent with Bartlett Hayward Co.; from 1932 to 1945, general superintendent of County Gas Co., Atlantic Highlands, N. J., and since September 1945, engineer of distribution for Providence Gas Company.

Mr. Wood graduated from U. S. Naval Academy in 1924 and joined the gas industry as a cadet engineer at York, Pa., in 1926. He later served as plant superintendent and general superintendent, North Penn Gas Co., Port Allegany, Pa.; and then assistant to the gas engineer and division superintendent, Jersey Central Power and Light Co., Asbury Park, N. J., 1931-1941.

Following the war, he was general superintendent of gas operations at Jersey Central Power and Light Co., Long Branch, N. J., then became superintendent of distribution for Tampa Gas Co., Tampa, Florida. He was made assistant engineer of distribution at



Donald Whitcomb



J. L. Wood

the Providence utility in August 1948.

Both men are members of American Gas Association.

Personal and otherwise

A. G. A. extends coordination of research work

STILL further integration and coordination of American Gas Association's research activities under the PAR Program was accomplished June 1, 1949 by two major extensions of staff responsibility.

Thomas Lee Robey was appointed secretary, A. G. A. General Research Planning Committee succeeding Dr. N. K. Chaney. Mr. Robey continues his present duties as coordinator of gas production research.

Dr. Chaney's duties as A. G. A. research consultant on gas production work have been broadened to cover domestic, industrial and

commercial, and general technical research activities and projects. His services as consultant are now available to all committees engaged in research work, including the General Research Planning Committee, and to research personnel of the Association.

Edward P. Noppel, Ebasco Services Inc., New York, is chairman, General Research Planning Committee which is responsible for the over-all planning of all A. G. A. research activities. Edward G. Boyer, Philadelphia Electric Co., Philadelphia, Pa. is chairman, Gas Production Research Committee.

Corson made Philadelphia comptroller

ALBERT S. CORSON has been appointed comptroller, Philadelphia Electric Co., Philadelphia, Pennsylvania. Mr. Corson has been active in American Gas Association Accounting Section for many years and served as chairman of that Section, 1934-35.

His entire business career has been spent with The United Gas Improvement Co., Philadelphia, and affiliated companies. Mr. Corson was vice-president of U.G.I. at the time of his present appointment.

In addition to American Gas Association,

Mr. Corson is active in numerous accounting organizations, a member of Edison Electric Institute, Pennsylvania Gas Association, Pennsylvania Electric Association, as well as Controllers Institute of America.

Three gas men advance at Brooklyn Union

THREE APPOINTMENTS in the commercial and auditing departments have been made by The Brooklyn Union Gas Company.

Howard D. Amann, manager of credit and collection section, has succeeded to the post of assistant manager, commercial department, vacated by Maurice F. Monahan who recently became manager. John B. Olsson, formerly

assistant manager, credit and collection section, treasury department, has been named manager of the credit and collection section. J. K. Laurentz has been appointed manager, auditing department.

Mr. Amann is currently chairman of American Gas Association Project Committee on

The Credit Picture. This group is a project committee of the A.G.A. Accounting Section's Customer Collections Committee.

Mr. Laurentz is a member, A.G.A. Subcommittee on Internal Auditing, a subcommittee of the Accounting Section's General Accounting Committee.

Officials named for new Louisiana gas firm

AB. HARPER, president, Fort Smith Gas Company and several other utilities in Fort Smith, Ark., has been named president of the new Louisiana Natural Gas Corporation, Shreveport, which has started operation of a 100-mile, war-built natural gas pipeline in Southwestern Louisiana. Frank S. Kelly, Jr., former official in the pipeline and production departments, Arkansas-Louisiana Gas Co., Shreveport, has been named executive vice-president and general manager of the new company.

Other officers of Louisiana Natural Gas

are: chairman of the board—W. A. Delaney, Jr.; Ada, Okla.; vice-president—E. Holley Poe, New York, and H. L. Hawkins, New Orleans and Houston.

President Harper has announced that the new concern purchased its pipeline from War Assets Administration for \$5,257,000. The company will offer new outlet to oil and gas operators who have natural or casinghead flare gas to market, Mr. Harper said.

Mr. Kelly has been with Arkansas natural gas companies since graduation from Texas A & M College in 1926. He started with a

predecessor company as a junior engineer and has worked in all phases of gas activities. For the past few years he was in charge of gas purchases and supervisor of industrial sales.

Prior to that time, Mr. Kelly was general superintendent of distribution for Southern Cities Distributing Co., a predecessor. He is a director, Independent Natural Gas Association, a past-president, Southern Gas Association, and a member, American Gas Association.

Mr. Poe is also a director, Texas Eastern Transmission Corp., Shreveport.

Jones and Knighton advanced by Servel

GEORGE S. JONES, JR. who has been vice-president in charge of sales at Servel, Inc. since 1936 has been named vice-president and assistant to the president, according to Louis Ruthenburg, president, Servel, Inc., Evansville, Indiana. Mr. Jones will serve in an advisory capacity with respect to sales and other functions of the business.

John K. Knighton who has been assistant vice-president in charge of sales and general sales manager for more than six months has been made general sales manager, reporting directly to the management and assuming full responsibility for all sales functions of

household refrigerator, air conditioner, water heater and export sales—sales promotion, advertising and sales research.

Mr. Jones joined Servel in 1933 as a district sales manager in Texas. He later was named the company's regional manager in that area. He then moved to Evansville as general sales manager, and in 1936 was named vice-president in charge of sales.

Mr. Knighton joined Servel as manager of the all-year air conditioning division in 1939, serving in that capacity all during the company's development of this new product. In 1947 he was promoted to manager of sales.



G. S. Jones, Jr.



J. K. Knighton

In March 1949 Mr. Knighton was named to the post of assistant vice-president.

American Natural Gas management changes

DIRECTORS of American Natural Gas Company on June 16 elected F. W. Sharp vice-president and treasurer, and Stanton S. Faville, secretary and general attorney.

The two officials succeed to most of the offices formerly held by Henry Tuttle, who has become executive vice-president of the

subsidiary, Michigan Consolidated Gas Company.

Mr. Sharp formerly was first assistant treasurer of American Light & Traction Co., which has been renamed American Natural Gas Company. He is a member of American Gas Association. Mr. Faville previously was an

attorney with the company.

Four other officers of American Light continue in their same capacities with American Natural Gas. They are William G. Woolfolk, chairman of the company; Henry Fink, president; Ralph T. McElvenny, financial vice-president, and W. F. Douthirt, vice-president.

Ladewig joins Clayton & Lambert firm

LARRY L. LADEWIG, head of the utilization department, Houston Natural Gas Corp., Houston, Texas, has resigned from the company to become manager of the water heater sales division, Clayton-Lambert Manufacturing Co., Louisville, Kentucky. Mr. Ladewig has been in charge of Houston Natu-

ral's air conditioning program since its inception.

He has also attained nationwide prominence in the gas air conditioning field, and for the past two years has been chairman, All-year Gas Air Conditioning Committee, American Gas Association.

Following graduation from Texas A & I College, Mr. Ladewig joined Houston Natural in 1939 as a cadet engineer. After serving in both the engineering and sales departments he was named head of the newly-created utilization department in October 1944.

Ontario gas man retires

AFTER 48 YEARS in the Ontario Gas industry, E. C. Steele has retired as general superintendent, Union Gas Co. of Canada Ltd. Mr. Steele has been with Union Gas Company in Chatham for 31 years and has contributed widely to the development of the gas industry.

He has been active in safety work for more

than 20 years, a member of the administrative committee, Industrial Accident Prevention Association for many years and president of that organization in 1940. Mr. Steele is a member of American Gas Association and has been a constant attendant at A. G. A. Technical Section conferences for many years.

Marbury elected Mississippi president

WILLIAM G. MARBURY, vice-president, Mississippi River Fuel Corp., St. Louis, Mo., was elected president of the firm at a meeting of the board of directors in New York recently. Mr. Marbury succeeds Ben C. Comfort who was named chairman of the board. Roscoe C. Hobbs, president, Hobbs-

Western Co., St. Louis, and Joseph Hardin, Grady, Ark., were elected directors.

The company owns pipelines carrying natural gas from Louisiana and Texas fields to St. Louis and other points. The Laclede Gas Light Company receives its natural gas from Mississippi River Fuel Corporation.

Monahan made Brooklyn commercial manager

MAURICE F. MONAHAN has been appointed manager, commercial department, The Brooklyn Union Gas Co., succeeding H. R. Jesper who retired after 17 years with the utility.

A graduate of Columbia University, Mr. Monahan joined Brooklyn Union in 1933 as

a collector and advanced successively to inspector, supervisor; manager, credit and collection section; and assistant manager, commercial department. He is a member of Accounting Employee Relations Committee, American Gas Association, and also of American Management Association.

Terry moves up at Chase



L. F. Terry

LYON F. TERRY, active in various phases of the oil and natural gas industry, was promoted on June 8, 1949 from second vice-president, Chase National Bank, New York, N.Y. to vice-president in the petroleum department.

Mr. Terry is a former vice-chairman, Committee on Natural

Gas Reserves, American Gas Association, and is currently active in A. G. A. activities. He has presented numerous papers at meetings of A. G. A. and other gas associations.

Before and after service during World War I, Mr. Terry engaged in oil field engineering in Oklahoma and Texas. Subsequently he performed valuation engineering for the Government and with Standard Oil Co. of New Jersey.

A graduate in civil engineering from University of Michigan, Mr. Terry first joined Chase National Bank as an engineer in the petroleum department, one of the most progressive in the country. He was appointed a second vice-president in 1940.

New Yorkers get A.G.A. McCarter Awards



Principals in presentation of A. G. A. McCarter Awards to four employees at Consolidated Edison Co. of New York, Inc. (left to right) G. A. Noseworthy, recipient of medal and certificate; G. W. L. R. Travis, associate manager, outside plant construction department; Francis Curry, recipient of medal and certificate; F. C. Shaughnessy, general superintendent, outside plant construction department; E. L. Griffith, assistant vice-president; E. J. Petzing, recipient of certificate of assistance; J. L. Lufkin, manager, station construction and shops department; J. J. Cerney, recipient of medal and certificate, and C. E. Hickey, manager, outside plant construction department. The awards are sponsored by A. G. A.

Waring promoted at Consolidated Edison

MOWTON LECOMPTE WARING, planning engineer, Consolidated Edison Co. of New York, Inc. since 1947, has been elected an assistant vice-president by the board of trustees. Mr. Waring will assist James F. Fairman, vice-president in charge of electric and gas production and operation.

A graduate of Virginia Military Institute in 1927 and holder of an M.S. degree in elec-

trical engineering from Union College, Mr. Waring joined the Consolidated system in 1933. He is a licensed professional engineer, member of the system engineering committee, American Institute of Electrical Engineers, and of the New York Engineers' Committee on Student Guidance. He is author of a number of technical papers and articles.

"Blue Flame" glasses a popular item

A SIMPLE AND ATTRACTIVE METHOD of keeping the clean, blue gas flame in front of customers' eyes and noses is suggested by the Gas Appliance Manufacturers Association. "You can't do it better than to have your customers drink from a handsome tumbler with a blue flame on it."

Organized as a "gag" at the American Gas Association Convention last October, the blue flame glasses have become a popular item. Currently more than 8,400 of these glasses

are reminding American men and women that gas not only seals in the nourishing vitamins and minerals in the food it cooks, but sterilizes bottles and gives you a lift when you need it.

The blue flame is permanently silk-screened on a standard heavy-bottom, 11-ounce, safe-edge tumbler, 5¼ inches high. Blue flame glasses in sets of eight, are available at \$2.00 a set from the Gas Appliance Manufacturers Association, New York, N. Y.

1948 A.G.A. Proceedings available

PROCEEDINGS of American Gas Association covering important papers presented at the Annual Convention and various sectional meetings during 1948 are now available at Association headquarters.

Price for members is \$3.00 and for non-members \$7.00. Checks or money orders should accompany order and should be addressed to Order Department, American Gas Association, 420 Lexington Avenue, New York 17, N. Y.

Copies of Proceedings for 1945, 1946 and 1947 are also available and may be obtained from the same address and at the same price.

San Diego appoints

WALTER F. CHAPMAN, who has been associated with San Diego Gas and Electric Co., San Diego, Calif., in various capacities since 1922, has been appointed commercial manager of the company. Prior to his promotion, Mr. Chapman served as superintendent of the customer extensions department. He succeeds H. G. Dillin who was chosen vice-president in charge of sales.



W. F. Chapman

Elmer treasurer of Texas Gas

WM. ELMER has been elected treasurer, Texas Gas Transmission Corporation. He has been associated with Texas Gas since June 1947, when he was employed as comptroller of Memphis Natural Gas Company. Following the merger of Memphis Natural and Kentucky Natural Gas into Texas Gas in April 1948, Mr. Elmer was elected Comptroller of Texas Gas.

Prior to joining the Texas Gas organization, he was associated for nine years in the Chicago and St. Louis offices of Arthur Andersen & Co., Public Accountants and Auditors where he devoted a major portion of his time to natural gas and other utility accounting.

Elizabeth Beveridge

ELIZABETH BEVERIDGE, since 1949 home equipment editor, *Woman's Home Companion*, has joined U. S. Department of Agriculture as housing specialist in the housing and household equipment division, Bureau of Human Nutrition and Home Economics. Miss Beveridge's chief job at present is concerned with preparing research results for publication.

Stacey-Dresser appointment

ROBERT LAGAS has been appointed purchasing agent for Stacey-Dresser Engineering, Cleveland, Ohio. Mr. Lagas joined the firm as chief inspector two and one-half years ago and has been serving as assistant purchasing agent for the past year.

Correct address needed

MEMBERS of American Gas Association and subscribers to the MONTHLY who plan to move soon or who have new addresses, are requested to provide notification of correct address as far in advance as possible as subscription lists are prepared several weeks before publication date. Changes of address should be mailed to Membership Department, American Gas Association, 420 Lexington Ave., New York 17, N. Y.

Canadian convention draws large audience

ONE OF THE MOST SUCCESSFUL meetings ever held by Canadian Gas Association was the forty-second annual convention at Bigwin Inn, Lake of Bays, Muskoka, Ontario, June 16-20.

Presiding at the general sessions on Friday morning, Alexander MacKenzie, General Steel Wares Ltd., Toronto, as out-going president of the association, outlined the group's extensive activities during the year. Charles M. Seiger, United Gas and Fuel Co. of Hamilton, Ltd., was elected president of the association.

Also elected were the following officers: first vice-president—Hugh G. Smith, Consumers' Gas Co. of Toronto; second vice-president—R. M. Perkins, Windsor Gas Co., Ltd.

Opening paper of the convention and one that attracted much favorable comment was delivered on Friday, June 17 by T. Pates Pinckard, vice-president and general manager, United Gas and Fuel Co. of Hamilton, Ltd. Mr. Pinckard's title was "Canada and the Gas Industry."

A featured address on Friday afternoon was the talk, "Catalytic Reforming and Thermal Cracking," by Edwin L. Hall, director, A. G. A.

Testing Laboratories. Mr. Hall brought his audience up to date on the American gas industry's extensive research in catalytic reforming of hydrocarbons.

H. E. Merrill, chief engineer, Dominion Natural Gas Co., Ltd., Buffalo, N. Y., described the high Btu oil gas plant at Port Stanley, Ontario. Milton W. Heath, president, Heath Tree Service, Inc., Wellesley, Mass., discussed the important subject of accounting for unaccounted for gas.

Features of the Saturday program included an address, "Things May be Changing Now" by C. George Segeler, A. G. A. utilization engineer, and an analysis of successful dealer co-operation programs by H. D. Valentine, sales promotion manager, The Peoples Gas Light & Coke Co., Chicago.

Delegates also showed wide interest in the following papers which were presented on the four-day program: "F.M. Radio Communication" by W. L. Dutton, operations engineer, Union Gas Co. of Canada, Ltd.; "After the Sale—What?" by Byrne Hope Sanders, Editor, *Chatelaine Magazine*, Toronto, and "Signifi-

cance of Recent Oil Discoveries in Alberta," by Dr. Oliver B. Hopkins, vice-president, Imperial Oil Ltd., Toronto.

Elected to the executive committee were Alexander MacKenzie, General Steel Wares Ltd., Toronto; E. H. Rohrer, gas division, B. C. Electric Railway Co., Ltd., Vancouver, B. C.; F. A. Brownie, Canadian Western Natural Gas Co., Ltd., and president, Northwestern Utilities Ltd., Calgary, Alta.; Carl H. Lutz, Dominion Natural Gas Co., Ltd., Dunnville, Ont.; Raymond Latreille, Quebec Hydro-Electric Commission, Montreal; H. W. Durgy, Dominion Natural Gas Co., Ltd., St. Catharines, Ont.; P. W. Geldard, Consumers' Gas Co. of Toronto; F. R. Palin, Union Gas Co. of Canada Ltd., Chatham; Alan H. Harris, Jr., Winnipeg Electric Co., Winnipeg; K. L. Dawson, Nova Scotia Light and Power Co., Ltd., Halifax, N. S.

Manufacturers will be represented by J. W. Ostler, Canadian Meter Co., Ltd., Hamilton, Ont., and W. J. Beacock, Beach Foundry Ltd., Ottawa. G. W. Allen, Toronto, continues as executive secretary and treasurer of the association.

Associated organization activities

Michigan gas men elect Herringshaw

DON E. HERRINGSHAW, general supervisor of gas operations, Consumers Power Co., Jackson, Mich., was elected president of Michigan Gas Association at the group's annual convention, June 24 and 25, 1949. Henry Tuttle, executive vice-president, Michigan Consolidated Gas Co., Detroit, was elected vice-president, and A. G. Schroeder, Michigan Consolidated Gas Co., re-elected secretary-treasurer.

T. W. Weigle, vice-president, Michigan Consolidated Gas Co., and retiring president of

the association, opened the meeting with a description of activities during the past year. An other feature of the sessions, which were held at Mackinac Island, was an informative address by E. S. Pettyjohn, director, Institute of Gas Technology, Chicago, entitled "Experimental and Research Work—Coal to Gas Conversion."

C. T. Dickman, Michigan-Wisconsin Pipe Line Co., discussed the new Michigan-Wisconsin Pipeline. J. E. Spindle and R. R. White reported on fellowships at University of Michigan.

Canadian gas and petroleum men convene

C. N. GLENNY, Provincial Gas Co., Ltd., Fort Erie, Ontario, was elected president at the twenty-third annual convention of Natural Gas and Petroleum Association of Canada in London, Ontario, May 26 and 27.

Other new officers elected are: first vice-president—S. B. Severson, Dominion Natural Gas Co., Buffalo, N. Y.; second vice-president—J. B. McNary, Hamilton, Ont.; treasurer—George H. Smith, Port Colborne; secretary and assistant-treasurer—Joseph McKee, United Gas and Fuel Co., Hamilton. S. A. Morse, Chatham, is past-president.

Mr. Glenn reported that during the year the association had entered into an agreement for affiliation with Canadian Gas Association similar to the agreement of the previous year with American Gas Association.

At the Friday afternoon session, President Glenn turned the chair over to Vice-President Severson who conducted a questionnaire on natural gas problems. J. K. Calhoun, Bastian-Blessing Co., Chicago, dealt with the question, "Where can L.P. gas fit into the picture of our companies to take care of outlying districts of

our markets until pipeline extensions can be made?"

"Cementing of Gas Wells" was discussed by R. W. Mitchell, division superintendent, eastern district, Haliburton Oil Well Cementing Company. The paper was supplemented by a sound film showing the work done by the Haliburton company.

A resolution congratulating John Carmody of Brantford, 86-year-old veteran of the natural gas industry, on his service in opening new fields and as the discoverer of the Haldimand gas field, was unanimously approved.

PCGA preparing significant program

A PROGRAM of broad significance is promised for Pacific Coast Gas Association's fifty-sixth annual convention in Santa Barbara, Calif., September 7-9, according to Clifford Johnstone, PCGA managing director.

The tentative list of speakers now being developed by Program Committee Chairman Robert A. Hornby, vice-president, Pacific Lighting Corp., San Francisco, includes several of national importance both inside and

outside the gas industry. Following a practice adopted since the war, the proceedings will consist of a series of general sessions, all of which will be held at the Lobero Theater in Santa Barbara. The first session, slated for Wednesday afternoon, September 7, will be devoted to association matters, including the report of the Nominating Committee, reports from section chairmen, and addresses by representatives of American Gas Association and

Gas Appliance Manufacturers Association.

On Thursday morning, delegates will hear discussions by PCGA members on various aspects of gas industry safety, marketing and supply problems. Thursday afternoon's session will be confined to a series of addresses on economic subjects by a panel of national authorities. The final session on Friday morning will be devoted to employee relation problems. (Continued on next page)

PCGA program

(Continued from page 47)

Included among social events scheduled for the convention are a "Friendship Hour" at which gas appliance manufacturers will be hosts, the president's ball, a golf tournament, and a series of teas, luncheons and tours for the ladies. Chairmen of the various convention committees are as follows:

Program—Mr. Hornby; convention arrangements—George W. Smith; hostess—Mrs. A. F. Bridge; entertainment—M. L. Fort; properties—F. B. Wright; housing—C. H. Potter; registration—R. F. Ogborn; transportation—W. M. Minyard; publicity—Otto C. Mauthe; convention newspaper—J. T. Van Rensselaer, and Golf—George H. Finley.

SGA holds employee relations meeting



Participants in first employee relations conference held by Southern Gas Association. V. H. Lunsberg, chairman of Southern association's employee relations section, is third from left, standing.

Domestic research

(Continued from page 10)

Get Optimum Use from Research Bulletins"
W. B. Kirk—"Venting of Gas Appliances Aeration and Humidity Control"
L. J. Kane—"Ignition By Automatic Pilots"
E. J. Weber—"Gas Burners and Combustion—Problems and Solutions"

H. W. Geyer—"Public Rules and Ordinances Affecting the Use of Gas"

Frank J. Nugent—"Dynamic Forces Affecting Gas Appliance Design and Manufacture"

William M. Myler—"Up-To-Date Information on Appliances, Installations and Performances—The Space Heating Research Program"

Robert C. Bryce—"Up-To-Date Information

on Appliances, Installations and Performances—The Water Heating Research Program"

Frank H. Schneider—"Up-To-Date Information on Appliances, Installations and Performances from the Cooking Research Program"

Walter B. Kirk—"Effects of Confined Space Installation on Central Gas Space Heating Equipment Performance"



Thomas J. Gallagher

manager of commercial sales department, The Peoples Gas Light and Coke Co., Chicago, died of a heart attack on June 14 at Richfield Springs, N. Y. He was returning to Chicago from a Food Service Equipment Industry, Inc., convention at Wentworth-by-the-Sea, New Hampshire.

Mr. Gallagher was 58 years old. He had been an employee of Peoples Gas for 43 years and had served the company in an executive capacity since 1927 when he was appointed manager of the hotel section, hotel and restaurant department. He organized the commercial sales department of Peoples Gas in 1936 and had been manager of the division since that time.

Mr. Gallagher was past-president of the Chicago Restaurant Purveyors Association and a member of the advisory board, Food, Beverage and Equipment executives.

He was also prominent in American Gas Association work where, as a member of Industrial and Commercial Gas Section, he had long been one of the most active commercial gas men. He had served as a member of the Managing Committee and as chairman or member of other committees, including Food Service Equipment, Dealer Cooperation, Equipment Improvement, Appliance Servicing, Displays, and Programs and Papers. He also served as chairman, Subcommittee on Approval Requirements for Gas Counter Appliances, Subcommittee on Approval Requirements for Hotel and Restaurant Ranges, Deep

Fat Fryers and Unit Broilers, and was a member, Subcommittee on Standardization of Requirements.

He always took an intense interest in promoting the cooperation of hotel and restaurant equipment dealers to further the sale of gas for volume cooking, and was the leader in bringing about the good relations existing between the trade association of Food Service Equipment Industry and A. G. A.

He was a speaker at numerous conference and convention meetings.

When the A. G. A. Industrial and Commercial Hall of Flame was organized to honor those who had contributed to the welfare of the industry through work in the Industrial and Commercial Gas Section, Mr. Gallagher was one of the charter members.

He is survived by his wife, Mary Burns Gallagher and five sons—Thomas J., Richard J., Robert A., William E., and James M., and two daughters, Mary B. and Ann Loretta. Also surviving are four brothers—Andrew A., Joseph A., John P., and James E. Gallagher, and three sisters, Mrs. H. D. O'Connell, Sister Mary Serena and Margaret Gallagher.

Newell E. French

manager rate department, Duquesne Light and Equitable Gas Co., died of a sudden heart attack at his home in Mount Lebanon, Pa., June 14. Mr. French had been active in American Gas Association activities and was a past-chairman, A. G. A. Rate Committee.

A native of Racine, Wis., Mr. French moved to Pittsburgh in 1928 and became supervisor of rate analyses for the two companies. In 1941, he was made head of the rate department of the light and gas companies.

He graduated from University of Wisconsin in 1923 and later served on Wisconsin Railroad Commission. He was a member of

Pittsburgh Chamber of Commerce and Engineering Society of Western Pennsylvania.

Besides his wife, Mr. French is survived by a daughter, Marjorie Jo; his mother, Mrs. Martha French, Racine; and a sister, Mrs. Dorothy Sarles, also of Racine.

William H. Haight

who retired last January after 43 years as commercial manager, Public Service Electric & Gas Co., Newark, N. J., died June 12 at his home. He had worked for the company 31 years in Hackensack and 12 in Ridgewood, New Jersey.

Surviving are his wife, Mrs. Athra Wypkoop Haight; a son, William H. Haight, Jr.; three daughters, Mrs. Stanley Durlacher, Mrs. A. James Scherrer, Mrs. Kenneth R. Lydecker, and two brothers, Walter R. Haight and Elmer T. Haight.

C. A. Leland

president, Iowa Power and Light Co., Des Moines, died May 25 following a sudden heart attack. He was 61 years old.

A graduate of University of Kansas, Mr. Leland moved to Des Moines in 1927 from Topeka, Kan., to become vice-president and general manager of Des Moines Electric Light Company and Iowa Power and Light Company. He was president of the combined companies beginning in 1933. He served as president, Kansas Power & Light Co., from 1931-1933 in addition to his Des Moines duties.

Mr. Leland is survived by his wife; a son, C. A. Leland III, Des Moines attorney; and a daughter, Mrs. Edward M. Rosenberg, Pasadena, Maryland.

J. T. Schilling, senior vice-president, Iowa Power and Light Co., will act as temporary head of the utility.

Storage of propane

(Continued from page 14)

capacity between five million and ten million a day seem to be the most economical and flexible. Below five million a day capacity, the unit cost per million capacity becomes excessive, while above ten million a day capacity the space required for enough storage tanks for an equivalent six or eight-day operation is so great as to restrict the choice of plant sites.

Estimates of plant construction cost can be simplified by separating them into two parts: First, the plant itself, that is, the controls, instruments, equipment, etc., used to vaporize, mix and send to market the required amount of propane-air gas; and, second, the storage and liquid handling facilities of the plant.

The installed cost of storage is usually not difficult to estimate. The total installed cost for a propane storage tank having 30,000 gallons water capacity, including the tank and everything associated with the tanks and tank farm, will vary between \$11,000 per tank for a ten tank installation and \$9,000 per tank for a 30-tank installation.

Estimating the cost of the plant itself is not quite so easy. Two plants, having exactly the same maximum daily capacity, will differ greatly in cost simply because one of them has a maximum operating pressure of ten Psig, and so requires only two 15 hp blowers to furnish air for the propane-air mixture, whereas the other plant operates at 100 Psig, and therefore has to have two 150 hp two-stage air compressors furnishing air for the propane-air mixture. Obviously, all other factors being equal, the two plants cannot be constructed for the same cost.

All propane-air plants require heat for vaporizing the propane. At some locations waste heat is available for this service; at others it is necessary to install boiler capacity for vaporization. Again, the construction cost of the two plants will vary. For general estimating purposes, it is more satisfactory to use cost figures for an idealized plant and location.

The following tabulation of plant costs, for various maximum capacities, is for such an idealized plant location. It is an average good location, just outside a third or second class city. There

is a railroad siding at the plant site, with room for at least six flat cars. The plant site is clear and level. Soil bearing is at least 2,000 pounds per square foot at foundation level. Neither electric service, city water nor steam are available. The required discharge pressure of the plant is 75 Psig (the maximum developed single stage).

Maximum Daily Plant Capacity in Equivalent Mcf of Natural Gas	Estimated Plant Cost Without Storage	Estimated Storage Cost for Six-Day Supply
3	\$ 75,000	\$ 88,000
5	112,000	132,000
7	145,000	170,000
10	195,000	230,000
15	272,000	320,000
20	353,000	415,000

It is sheer coincidence that regardless of size, these idealized plants will, on the average, cost about 85 percent as much as the installed cost of the storage tanks necessary for a six-day supply for that size plant. Such figures are good enough for preliminary planning.

To develop such preliminary figures for any capacity plant it is only necessary to remember three items: First, the \$9,000 to \$11,000 cost of standard storage tanks; second, that two and one half million cubic feet of equivalent natural gas can be stored in each tank; and third, that 85 percent of the cost of the necessary storage for six-day operation will be the approximate cost of the rest of the plant.

For example, if it were required to find the approximate cost of a propane-air plant having a maximum equivalent natural gas capacity of four MMcf per day, then a six-day supply for the plant would be 24 MMcf and at 2.5 MMcf per tank, ten tanks would be required to store a six-day supply of propane. The price per tank in lots of ten was \$11,000 and the storage portion of the plant would cost approximately \$110,000. The cost of the boilers, compressors, vaporizer, mixing controls, and other equipment for the 4 MMcf per day plant would then be 85 percent of \$110,000, or \$93,500.

It is not intended to imply that all plants should have a six-day supply of

propane on hand at the start of the winter season. Each plant is a separate problem and must be considered in the light of its particular requirements. Some plants require only a three-day supply, others need a ten or even a 15-day supply. The average has been from five to eight equivalent, full-days' operation.

Until 1944, it was general practice for propane-air plants to depend on winter delivery for from one-half to two-thirds of their requirement. Since 1944, many plants, both large and small, have been built. The total volume of propane used has increased by geometrical progression. Each year the volume used was about one and a half times that of the previous year. Of course, the supplier has increased his production capacity and transportation facilities.

In spite of this increased supply and the fact that "distress" material was available during the entire winter season of 1948-49, it is the writer's opinion that for a normal winter season the winter time demand for propane may again exceed both the supply and the transportation facilities.

Most of the large suppliers of propane will deliver material on a one-to-one basis, a few will only deliver one-half the quantity per month in the winter time that they deliver during the summer, and only one or two will deliver at the ratio of one and a half in the winter to one in the summer. The winter price is usually higher than the spring and summer price. Two years ago the winter price was almost twice as much as the summer price. The only safe way is to provide enough storage for essentially all of the winter season requirements.

As previously mentioned, each storage tank has a water capacity of 30,000 gallons, and during the winter period can be used to store about 27,000 gallons of propane. This amount of propane is approximately equivalent to two and one-half million cubic feet of natural gas. To get the total number of tanks required, it is then necessary to divide the total volume of gas to be furnished in the winter season by 2.5; the result will be the number of tanks. For practical estimating purposes, 11,000 gallons of propane is equivalent to one million cubic feet of natural gas. (Continued on next page)

(Continued from page 49)

Construction costs of propane-air plants have increased materially during the past four years by almost ten percent per year. Unlike most construction, the direct labor cost of a propane-air plant is only about 12 percent of the total cost of plant and storage; consequently, the total cost of a plant is materially changed by any change in steel costs.

In general, the plants should have a long life and a low depreciation charge. The current total cost of propane-air gas delivered into the natural gas line, on the peak day, and against a pressure of 75 Psig is about \$1.40 per Mcf of equivalent natural gas. Of this amount \$1.10 is the cost of the propane and \$.30 is direct operating cost. When used to "shave" peaks, and with a demand-commodity rate, a plant may pay for itself in three to five years.

For example, suppose it was determined that the peak demand, for which the charge is \$2.00 per Mcf per month, could be lowered by ten MMcf through the use of a propane-air plant

having a maximum daily capacity of ten MMcf and operating at various rates up to ten MMcf per day for a total of 20 days, during which time it would replace a total of 80 MMcf of natural gas. By the methods mentioned earlier, the total number of tanks required to store a full winter supply for this plant would be 32, at a total installed cost of approximately \$278,000.

The ten MMcf per day plant, to go with this storage, will, by the estimating method given before, cost about \$190,000. Total estimated cost of plant and storage is then \$468,000. Reducing the peak demand by ten MMcf will produce a gross reduction in the annual demand charge of \$240,000. But at a total production cost of \$1.40 per Mcf for the equivalent propane-air gas, it will cost \$112,000 to save the \$240,000, and the net saving will be \$128,000. With an estimated total plant cost of \$468,000, this rate of saving will pay for the plant in about three and two-third years.

For some companies, propane-air alone may be the solution to the peak

load problem. For other companies so situated as to have available depleted gas fields that can be used for underground storage, the propane-air plant offers the advantage of quick start-up and shut-down to supply that extra gas during the extreme demand periods or late in the season when deliverability from underground storage is at its lowest.

For still other companies located in areas where there is no possibility of underground storage, the propane-air plant may be used in combination with one of the several types of manufactured gas systems, devised to produce winter base load gas. When used in such a combination, its advantages are its extreme flexibility of turn-down, its faculty of starting up quickly and requiring only a small operating crew, plus, of course, its ready interchangeability with both natural and manufactured gas.

Wherever the propane-air plant is used, it can be the answer to the fervent prayers of both the gas dispatcher and the company treasurer.

Combination billing

(Continued from page 26)

summary cards for monthly report purposes.

After the revenue runs are completed the current month's tabulating cards are sorted to route and account number order.

Unpaid ledger cards are obtained from Ledger Section for collating into "current month" tabulating cards, then all cards are routed to Billing Section.

"Tabulating Machine Section equipment consists of four tabulating machines, two of which are equipped with summary punch machines and one with

a summary key punch; three reproducers, one collator, six sorters, one key punch machine, and two interpreters.

Billing Section—Billing cards (from the Tabulating Machine Section) and Addressographed customers' bills (from Compare Section) are placed in electric billing machines for reproducing or printing all essential billing information from respective "billing cards" to the related customers' bills.

At the present time, 24,000 customers' bills are the daily output of the three billing machines, with additional capacity still available for future increased volume.

Electric billing machines while print-

ing customers' bills, are also accumulating gas revenue amounts and electric revenue amounts (by routes) for checking with respective summary card controls maintained in Tabulating Machine Section.

Customers' bills are routed to respective division collection departments and/or to various district offices for mailing to customers. Tabulating cards (from which customers' bills were made) are routed to Ledger Section.

The centralized billing unit is on a four-working-day billing schedule, i.e. customers' bills are released for mailing on the fourth day from the date that meter books are received in the unit.

Convention program

(Continued from page 3)

Breakfast this year will be in the Red Lacquer Room, Palmer House, on Wednesday morning, October 19. The Home Service Round-Table in the Sherman Hotel on Wednesday afternoon will feature talks on home service activities that will be of great interest to sales executives as well as to home service representatives.

Headquarters of the Technical Section will be at the Morrison Hotel where meetings will be held on the afternoons of October 18, 19 and 20. These sessions will be highlighted by presentations of authoritative speakers covering the most important technical phases of the gas industry.

The Convention Entertainment Committee, under its chairman, H. D. Val-

entine, The Peoples Gas Light & Coke Co., is arranging an attractive program for the social phase of the convention. The President's Reception and Dinner will be held on Tuesday evening and the ladies bridge party will be given on Wednesday. Plans are being formulated for an entertainment program with a "high Btu content" of musical and theatrical value.

Combustion problems

(Continued from page 17)

deposition in the combustion chamber must be avoided. Dilution must be accomplished without undue pressure drop and must be uniform to avoid local overheating of the turbine.

Of the problems already mentioned probably the most severe is that of maintaining inflammation at high altitudes. As will be realized, both the temperature and pressure of the inlet air become very low as the altitude is increased. Although the compressor raises the absolute pressure of the air entering the combustion chamber, the conditions are very different from those experienced at lower altitudes. This pressure condition taken together with inlet air temperatures of 50° below zero make it difficult to maintain reasonable combustion efficiency or even to maintain combustion at all.

This problem is complicated further by the fact that the aircraft must be able to change altitude in extremely short intervals of time. The combustion conditions can, therefore, change rapidly, and in the type of engine which is utilized most frequently today it is not uncommon to have the combustion cease at high altitudes. Under these circumstances it is sometimes possible to reignite the engine by diving to a lower altitude.

Combustion problems of the turbo jet combustor² can be made clear by examining a typical construction as shown in Figure 2. Because of weight considerations the chamber is made of light sheet alloy. It consists of an inner cylindrical chamber surrounded by another cylinder. Combustion occurs in the forward portion of the inner chamber and dilution occurs in the back portion.

Since there is no insulation the combustion must be isolated from the wall to avoid overheating. This is accomplished by properly placing air inlet holes to provide an air blanket over all inner surfaces of the inner chamber. Other holes allow combustion air to enter, mix with and burn the atomized fuel. This air is introduced so as to give very definite turbulent flow patterns. This turbulence is the only provided means of maintaining ignition at

the necessary high velocities.

Further downstream, the remaining dilution air enters the inner chamber and lowers the temperature of the burned mixture. The major flow of air occurs between the inner and outer shells, thereby removing heat from the inner chamber.

Evidently the success or failure of the combustor depends upon the placement and sizing of the air introduction openings, and generally speaking the present combustors have been developed by trial and error. Present designs give combustion efficiencies of 98 percent at low altitudes but the efficiency drops as low as 40 percent at low speeds and high altitudes. Combustor service of 200 hours before failure is now considered exceptional. Therefore, quite apart from the specific requirements of any particular type of jet engine in respect to the types of compressors and turbines employed, the major problems are to prevent the rapid deterioration of the combustion chamber, to prevent the snuffing out of combustion, to prevent carbon depositions and to provide to the gas turbine wheel itself a more or less uniform but well-defined temperature distribution pattern.

Industrial gas

Quite obviously this type of problem has very little in common with the normal industrial gas combustion problem where it is desired to burn a mixture of gases somewhere in the neighborhood of perfect combustion and to obtain in most cases flame temperatures as close to theoretical as possible. Furthermore, heat release intensities lower than five million Btu per cubic foot per hour seem satisfactory for the turbo jet, whereas releases upwards of 15 million are experienced in industrial practice.

Increasing the thrust

In the foregoing discussion concerning the maximum combustion temperature it was assumed that the turbine blades would attain the temperature of the combustion mixture. This would be the case if no cooling means were provided. However, it is possible to conceive of hollow turbine blades which might be cooled by some means such as air from the compressor. This

would allow the temperature of the combusted gases to exceed the maximum temperature of the turbine blades without failure of the turbine.

Since the over-all efficiency of the engine increases with increasing air temperature a substantial improvement can be made in the engine performance. In addition, the combustion problem would be simplified because a richer air-fuel mixture would be employed. This is being attempted and is looked upon as a future possibility. It is noteworthy to point out that an increase in temperature of the combustion gases by as little as 200° F increases the thrust of the engine by a very worthwhile amount.

Higher temperatures

In this regard then, either material to withstand higher temperatures is required for the turbine blades or some kind of cooled turbine must be developed. Both of these problems have been attacked, and the search for high temperature materials for turbine wheels has extended into the field of ceramics. Although industrially we can use alloys up to 1800° F with relatively long lives, they are subject mostly to very minor stresses and little shock compared to turbine wheel service.

Other methods of increasing the thrust are referred to as thrust augmentation cycles. One method consists of burning additional fuel in the oxygen-rich mixture of gases exiting from the turbine wheel so that the temperature of the exit gases may be raised as high as possible.

As mentioned above, the temperature restrictions of the turbine require a very lean mixture. Since this gas is still hot and compressed after passing through the turbine, it is practical to provide thrust augmentation by injecting fuel and burning it in the jet. In view of the fact that the air has already passed through the compressor, combustor and turbine, any heat that can be given to it before it expands from the final port will result in additional thrust. Here the limitation in the flame temperature is not present because the gases exit directly into the air and cannot cause damage to any critical moving parts.

This "after-burning" combustion involves the development of methods of fuel injection. (Continued on next page)

²A. J. Nerad, "Some Aspects of Turbo Jet Combustion," Preprint No. 219, I.A.S., 3-18-49.

(Continued from page 51)

ignition maintenance and combustion completion in a comparatively short space when the velocity of the mixture in the chamber is extremely high. Here it can be seen that the problem is somewhat similar to our present industrial problems and as indicated below is similar to the problem encountered in the ram jet.

A second thrust augmentation cycle involves the introduction of steam into the gases while bleeding off of an equivalent amount of air. This air is then allowed to pass off through and is burned in a separate jet. Cycles of this kind and engines using them have been utilized on experimental craft. At this writing it appears that the efficiency of engines using thrust augmentation will be lower than those without thrust augmentation. The major question in the utilization of these engines is their length of service and the specific fuel consumption.

It is worthwhile to compare the over-all operation of this type of thrust engine with the internal combustion propeller engine. Generally speaking, the turbo jet engine has a rather low efficiency at low speeds but improves at intermediate speeds and those closely approaching the velocity of sound.

As the velocity approaches that of sound, the turbo jet engine is far more efficient than the propeller engine, and jet engines have been built which will propel the aircraft in excess of the velocity of sound. Here another limitation is introduced which again deals with the question of the difference in velocity between the incoming and exit gases to the engine.

It readily can be ascertained that when the difference in velocity between the incoming and exit gas stream is too high a large amount of the energy in the exit stream instead of materializing as thrust merely creates turbulent eddies in the wake left behind. When this occurs the efficiency of the engine as a function of plane velocity decreases rapidly. This really means that there is a practical limit which cannot be exceeded in regard to thrust and that the velocity difference between the inlet and exit streams cannot be increased indefinitely, if an efficient engine is desired. In this regard then it becomes necessary as the velocity of the aircraft is increased, to

gain thrust by moving larger volumes of air rather than exceeding the critical velocity difference which results in decreased thrust efficiency.

Ram Jets¹

At very high velocities the necessity of the compressor, and therefore the turbine, disappears. Movement of the engine through the air can be made to serve as the compressor. In other words, movement of the engine through the air is identical to a movement of air through the engine. Thrust can be imparted to the aircraft then if fuel is added to this moving air and burned to cause a rise in temperature and consequent rise in exit air velocity. Evidently this is the same mechanism as that employed in the turbo jet for thrust augmentation by after-burning. This is the entire means of developing thrust in the ram jet. Elements of the ram jet are shown in Figure 3.

The ram jet engine is aptly described then as simply a flying tube. It has the advantages of simple construction and a total lack of moving parts. It has the obvious disadvantage of requiring secondary power to set it into motion and to give it an initial high velocity. The engine can develop no thrust at all when stationary and does not attain reasonable efficiency until velocities in excess of the speed of sound are attained.

At double the velocity of sound the efficiency is high and the thrust as a function of velocity is almost constant. Somewhere in the upper regions of velocities the efficiency tends to drop off again. At the present time, the engine seems to lack any importance as a prime-mover for commercial aircraft. It seems best suited for high-speed, one-way-trip, guided-missiles. Obvious military significance places most of the design details of the ram jet under restriction. Certain combustion problems, however, are well known.

The normal burning velocities of mixtures of fuel and air are of the order of a few feet per second. This means that flame will propagate through a static mixture at that velocity or conversely that a stationary flame front will be obtained if the mixture moves at that velocity. With preheating, or under conditions of turbulence, a somewhat higher velocity

may be obtained. When an aircraft moves through the air at a velocity of 600 miles per hour, the air entering the engine tube has, of course, the same velocity, about 900 feet per second.

In the ram jet, it is necessary to inject fuel into the air stream and burn it rather completely before the mixture issues from the tail pipe. The discrepancy between the air stream velocity and the normal burning velocity is quite apparent. A considerable portion of this difference is made up by placing an expanding or diverging section at the entrance of the ram jet. This section is called a super-to-subsonic diffuser. The air after passing through this section is slowed to a velocity of the order of 200 to 300 feet per second. Apart from the function of reducing the air velocity the diffuser provides an area upon which the jet can push, and, therefore, manifest its energy by thrusting the engine and the aircraft forward as gases exit from behind.

The combustion problem encountered in the ram jet, then, is to maintain efficient combustion in a mixture stream traveling at a velocity of 300 feet per second under streamline flow conditions when the normal burning velocity is of the order of few feet per second. This is a real problem with regard to the fundamental limitations of flame propagation. Here possibly is the problem which is most similar to the industrial problem. It would be of utmost value to know how to make flame propagate with a speed of 300 feet per second without artificial devices.

To date, this problem has only been approached by providing turbulent areas in the stream where ignition is maintained. In other words, the mixture is continuously ignited at the surface of turbulence-causing structures called flame holders, placed in the stream. Inflammation, having been initiated, continues and spreads to parts of the mixture not ignited in the flame holder. The closer together the ignition points are, the more complete the combustion will be before the gases exit from the jet. However, moving the ignition points nearer together means greatly increased drag on the aircraft. Consequently, a compromise must be reached. Besides the drag, the flame holders present a problem of finding a suitable construction material

since the holder tends to become very hot.

In comparison with the turbo jet it is apparent that a different limitation of temperature for the combustion products exists, since there is no turbine wheel for the burned gases to pass through. However, a temperature limitation exists. Since heavy metals are out of the question and suitable ceramics are not available, the temperature of the combustion products is limited by the efficiency of cooling the chamber enclosing the combustion. Again it is necessary to eliminate carbon deposition, for not only does this result in decreased efficiency of combustion, but ultimately it would render the whole system inoperable.

Each of the engines discussed has used atmospheric air to burn its fuel with numerous attendant difficulties. As the aircraft altitude increases there is less and less air to burn and the devices become inoperable for lack of oxygen. Furthermore, the difficulties encountered in combustion velocities in the ram jet can be eliminated by closing the front end so that there is no air intake. This is the rocket.

Rockets

The rocket is a propulsion device which provides its own air. The vehicle carries not only its fuel but also a supply of liquid oxygen or some other oxidizing agent. When the liquid fuel and oxidant are mixed and burned there is an extremely large increase in volume. The expanding gases push against the closed front end of the chamber and exit at the rear. The conservation of momentum requires that the aircraft must move forward as the gas issues from the back just as a gun recoils as the projectile issues from its muzzle. This takes place, of course, whether the aircraft is in a vacuum or in air.

It is interesting to note that the rocket has a constant efficiency regardless of the velocity of the aircraft movement. However, because it must carry its own oxidizing agent the time during which it can actually supply thrust to the aircraft is extremely limited. For this reason, rockets have been utilized only to provide thrust augmentation to an aircraft for exceedingly short periods of time such as for takeoff from a very confined space. The rocket principle is useful in launching a missile

whose flight will only be directed for the short period of time during which the thrust is applied.

Devices of this kind can attain velocities in the neighborhood of 3,500 miles per hour when thrust is applied for as little as one minute. The German V-2 was such a missile and burned many tons of liquid oxygen and concentrated fuel in one minute. Generally, the rocket is a means of propulsion for aircraft to be considered only when the aircraft is to fly in a region where there is no atmosphere.

The objective of this article is to bring out the fundamental purpose of the combustion processes utilized so that the true nature of the problems encountered can be compared on an equal footing with those normally encountered in industrial gas combustion.

It is clear from the foregoing that very little new in the way of fundamental combustion knowledge has been assembled. Merely intelligent and perhaps ingenious modes of meeting rather unusual combustion applications have been devised. The results obtained to date leave much to be desired, and there is great development activity directed towards improvement of the results obtained.

Turbo jet combustion has little in common with the industrial combustion problems normally encountered. It depends upon carefully-controlled turbulent areas for ignition maintenance and must yield uniform combustion products in the neighborhood of 1500° F free of carbon. The combustion problem here is identical to that of the industrial gas turbine with the exception of wide range of operating conditions imposed by flight conditions at high altitudes. The rate of energy release is unimportant here, but fundamental information on combustion factors as they effect efficiency of combustion at low pressures and temperatures is entirely lacking.

Ram jet combustion problems have much in common with present industrial attempts to get higher and higher rates of energy release. These problems are aptly expressed by quoting from "The Ramjet as a Supersonic Propulsion Plant" by Goss and Cook³:

"The really challenging problems are the processes of flame stabilization

at high flow velocities, mixing in gas streams and combustion in general. We are in a surprisingly elementary state of knowledge concerning these matters. Where does one find fundamental data to apply to a problem in which flames are established and maintained in fuel-air mixtures flowing at speeds ten or 20 times the laminar flame propagation velocities, where the fuel will likely be a heterogeneous vapor droplet mixture, where neither the fuel air mixture ratio nor the air velocity distribution will be isotropic, where inlet temperatures of interest certainly range from 150 to more than 1000° F, where pressures vary by a factor of ten or more as a function of altitude, and where wide variations in fuel air ratios may be required along the trajectory?"

Of course, industrial combustion problems do not have the wide variety of parameters that the ram jet problem imposes, but we are definitely interested in burning at velocities of upwards of ten times the laminar flame propagation velocity.

Present research into fundamental combustion phenomena seeks information about the detailed mechanisms necessary to understand the reasons for combustion velocity limitations. There is hope that further careful investigation into recurrent detonation phenomena will shed new light upon the details of flame propagation. Understanding of mechanisms for originating detonation and of the pressures generated during such detonation processes is most incomplete. A proper understanding of this phenomenon will contribute much to the knowledge of combustion.

The present review demonstrates that propulsion combustion and industrial combustion fields have the common major problem of increasing the rate of flame propagation, or the energy released per unit volume in a given time. The approach of present investigators is to make use of detonation as a tool, with the hope of eventually learning how to burn industrial gases at any velocity required either by utilizing the information obtained from detonation phenomena, or the process of detonation itself. There may even be the possibility of learning how to apply the pressures generated during detonations to more efficient generation of industrial power.

³ W. H. Goss & E. Cook, "The Ram Jet As a Supersonic Propulsion Plant," *S.A.E. Transactions*, Oct. 1948, pp. 42-657.

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Your money's worth

(Continued from page 7)

perhaps not seen since the preceding meeting, is the instantaneous catalyst that induces the real reaction of minds, and the real yield of profitable guidance on both sides.

He would be a backward soul, indeed, who after the first year or two, could come away from any annual meeting without at least a dozen new first-name friends, to push his circle of provincialism correspondingly outward. (It is superfluous to ask if the Doubting Thomas averages a dozen new friends a year in his field by any other means open to him, unless it be by endless travel.) Attending regularly, his contacts, instead of becoming so broad he cannot cope with them, become more selective and fruitful.

An enlightening illustration came out of a Denver regional meeting, when another delegate and I exchanged our company reports on that gathering. As Jack put it, "You wouldn't think we had been at the same meeting," for the problems and points we discussed with others were not the same problems and points, because the operations of our respective personal concern and our sources were not the same, and likewise the gleanings we deemed most worthy of reporting to our respective managements.

(3) Reciprocity is essential. In addition to attendance, participation in activities is the key that opens the door to the benefits sought. I can correspondingly understand the mental colic of the mail-order-minded member who sends in his annual dues and expects merchandise of said value to return to him at stated intervals. The poor fellow has his frustrations coming to him, but little sympathy. He's the chap who bought a bicycle but never learned to ride it,

then complains that it doesn't take him anywhere. He has never really appraised the three points made herein. If he has appraised them, he has done so under the handicap of not recognizing the Golden Rule, in professional society affairs, as not a rule at all but an automatic proportionality, truly though tritely expressed as, "You get out what you put in." The principle is that of trade. It is as simple as that.

Many inactive members sincerely believe that they are not qualified to write papers, for lack of either material or talent. Often, that may indeed be true, but it does not follow that they are unqualified to pursue other activities, such as serving on committees.

Someone may say that he has never been "put" on a committee. The process is not quite so passive. One has first to open his eyes to the many ways in which he could be most useful to others and thus in due process to himself and to his employer. To be selected, he must become visible. A few thoughtful letters written to the chairman of committees covering his field of work or his geographic area—making suggestions, offering criticisms, or even merely asking the questions he asks himself verbally—and he will soon find himself out on the main line moving with the traffic.

He can be perfectly selfish about it, not for a moment pretending that such activity on his part is out of the kindness of his heart or for love of his fellow man, but strictly on the basis that such is directly or indirectly a sound currency of trade for any of the several desirable objectives; professional recognition, technological information, a promotion, or a different job. It just happens to work that way, as many can attest. Even on a committee, there will be no one standing at his elbow telling him what to do. It is his in-time-well-rewarded job to think of something to do, just as in the conversations stressed under point (1) he must contribute information as well as seek it.

As so, the question "how to attend a meeting" or even "how to be a member" boils down to one simple principle: "Give and ye shall receive." The mechanics of doing so presume a smattering of originality and extraversion, but beyond that one could more simply convey the idea by defining how *not* to attend a meeting: Don't just sit still and wait for the manna to rain down. You will be disappointed if you do.



1949

AUGUST

- 8-11 •National Association of Railroad and Utilities Commissioners, Hotel Cleveland, Cleveland, Ohio
- 29-31 •Annual Appalachian Gas Measurement Short Course, West Virginia University, Morgantown, W. Va.

SEPTEMBER

- 6-8 •Mid-West Gas Association School and Conference, Iowa State College, Ames, Iowa
- 7-9 •Pacific Coast Gas Association, Santa Barbara, Calif.
- 9 •New Jersey Gas Association, Monmouth Hotel, Spring Lake, N. J.
- 9-10 •The Maryland Utilities Association, fall conference, Cavalier Hotel, Virginia Beach, Va.

OCTOBER

- 13-14 •Texas Mid-Continent Oil & Gas Association, annual meeting, Rice Hotel, Houston, Texas
- 17-20 •A. G. A. Annual Convention, Chicago, Ill.
- 17-21 •National Metal Exposition, Cleveland, Ohio (A. G. A. will have combined exhibit)
- 24-28 •National Safety Congress, Morrison Hotel, Chicago, Ill.

NOVEMBER

- 7-11 •National Hotel Exposition, New York, N. Y. (A. G. A. will have combined exhibit)
- 10-11 •Mid-Southeastern Gas Association, Raleigh, N. C.
- 21-23 •Wisconsin Utilities Association, annual meeting, Milwaukee, Wisc.
- 28-29 •National Personnel Conference of the Gas Industry, Netherland Plaza Hotel, Cincinnati, Ohio

1950

MARCH

- 23-24 •New England Gas Association, Hotel Statler, Boston, Mass.
- 27-29 •Southern Gas Association, Galveston, Texas

APRIL

- 3-5 •A. G. A. Distribution, Motor Vehicle & Corrosion Conference, Book Cadillac Hotel, Detroit, Mich.
- 4-6 •A. G. A. Sales Conference, Industrial & Commercial Gas Section, St. Louis, Mo.
- 10-12 •Mid-West Gas Association, Hotel Lowry, St. Paul, Minn.
- 11-13 •Southwestern Gas Measurement Short Course, University of Oklahoma, Norman, Okla.
- 17-19 •National Conference of Electric and Gas Utility Accountants, Brown Hotel, Louisville, Ky.
- 28-29 •Indiana Gas Association, French Lick Springs Hotel, French Lick

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Public Utility Accountant and Auditor—Now available for any phase of utility operating or holding company accounting—property, customer, general. Methods and systems work, studies on depreciation, maintenance, original cost, financing, etc. Administrative ability; willing to travel; twenty-five years experience principally with utilities; salary requirements moderate. (45). 1616.

Superintendent with water, coal and propane gas manufacture, and distribution experience. Graduate engineer, Professional Engineer license; Single, Veteran. 1617.

Chemist, B.S., 1949. Had qualitative organic analysis and instrumental analysis. Good background in mathematics. Prefer position within commuting distance of N. Y. C. 1618.

Chemical Engineer—Will graduate Syracuse in June. Desires position in technical sales field; course includes chemical processes, operations, instrumentation and design. Prefers East Coast; willing to travel anywhere. Veteran. (23). 1619.

Sales and Service Representative—16 years experience in gas industry. Desires connection with commercial equipment manufacturer,

preferably in middle western states. Fully qualified by background to handle mechanical problems on new appliances in the field, train dealers in servicing and do top grade promotional and sales work. 1620.

Chemical Engineer—D. Ch.E., five years experience in all phases of process engineering, research and development of coal tar by-products, low temperature fractionation of light hydrocarbons, pilot plant design, operation and development, activated carbon adsorption processes, process analysis. Publications. Honor and professional societies. (29). 1621.

POSITIONS OPEN

Service and Personnel Superintendent—To make headquarters in New York for national organization and spend half time traveling on supervisory work. Must be under 40 and have good gas appliance service experience. State present salary, starting pay expected, education and former employment. 0554.

Merchandise—Large Eastern gas utility seeking experienced man for promotional work in Sales Department. Must be trained in contacting

dealers and distributors and have ability to train retail sales force. 0555.

Engineer—experienced in gas distribution operations and appliance servicing; excellent opportunity in active, growing organization for young man capable of planning and supervising large scale operations; must be free to travel. Applications should give experience, education, age, and salary expected. 0556.

Assistant Director—in the Home Service Department of a large eastern gas utility. Applicants should hold a B.S. degree in home economics and be experienced in work of a supervisory nature in a similar field. 0557.

Salesman—Eastern territory. Excellent opportunity man familiar with distribution phases of gas industry to sell to gas companies and controls manufacturers. Young engineer with gas experience preferred. Product well known, well advertised. Old company. Salary, commission and expenses. State age, experience, background details, starting income required. 0558.

Utilization Engineer—A Medium Size New England Gas Company has an opening for an experienced Utilization Engineer to take over customer service department. State qualifications, age and salary expected in first letter. 0559.

Industrial relations

(Continued from page 6)

ployment and promotion, and the applicants are picked on ability, regardless of race, religion or nationality. Cases are generally settled by conference, conciliation, and persuasion rather than by punitive measures. The commissioners are aware of the power that the ordinance gives them, but are convinced that success depends not on employers merely obeying the letter of the law, but more on their abiding by its spirit.

● "Buying Psychological Services" is an informative article written in an amusing style by Donald G. Paterson, professor of psychology, University of Minnesota. This article appeared in the winter issue (Vol. 1, No. 4) 1948, of the publication *Personnel Psychology*. The advice and warnings of Professor Paterson about the selection of consulting industrial psychologists to aid in solution of business problems makes this article valuable from a protection standpoint for business executives.

● "General Wage Increases in Manufacturing Industries" (studies in Labor Statistics No. 1, April 1949) is a new survey of the National Industrial Conference Board. It summarizes the general wage increases for approximately two million production workers for the period 1940 to 1948, and approximately 400,000 clerical workers for the period 1945 to 1948. This survey covers approximately 700 companies in 30 industries.

● Fringe benefits to employers in industry have again been the subject of a survey. The U. S. Chamber of Commerce has pub-

lished the results of a survey under the title "The Hidden Payroll." The survey provides a factual basis for discussion and further study of non-wage costs. It is designed to aid in giving such costs proper recognition as supplements to worker income and as components of industry's labor costs. The public utility industry, whose fringe benefits average 20.5 percent of payroll, are second only to banks and financial institutions. Single copies will be furnished on request by the U. S. Chamber of Commerce in Washington.

● National Labor Relations Board recently held that a union is entitled to a certification election even if the employer is willing to grant recognition without an election. General Box Company contended that no election should be conducted because it had already granted representation rights to the International Association of Machinists (IND.) but the NLRB pointed out that an exclusive representation certification under the Taft-Hartley Act gives certain protections to a union among which is protection from "raiding" by other unions.

● An arbitration board has ruled that a supervisor can use his seniority in "bumping" into the bargaining unit. The case involves A. D. Julliard & Co., Inc., Rome, Ga., and the regular seniority list published by the company included the supervisor's name. The contract provided that if there was no protest to the list filed within 30 days after posting, the list was to be considered correct. The union contended that the contract was not made for the benefit of supervisors and therefore they could not "bump" into the unit, but the company claimed that a ruling in favor of the union

would be detrimental to employees since promotions to supervisor would jeopardize their accumulated seniority.

● Preparation of the individual for retirement is generally a very delicate problem. Aid in counseling employees about to retire may be had from a recently published book entitled "How to Retire—And Enjoy It," by Ray Giles (Whittlesey House, New York). A review is given in *Business Week* of April 30. While the book furnishes financial advice, considerably more space is devoted to other aspects of retirement. It counsels in the development of unused personal assets and suggests ways to avoid the feeling of being "on the shelf."

● April 1949 issue of *Management Record* published by National Industrial Conference Board contains an article "Job Evaluation: Guide to Salaries" by Herbert S. Briggs. The article relates the experience of a large petroleum company in the establishment of a job evaluation plan for salaried employees which was not designed to furnish rigid control of salaries but rather to serve as a guide for department heads. Operation of this plan may be of great interest to many readers.

● Employee group health and accident insurance plans are bargainable issues, according to U. S. Court of Appeals in Boston. The case involves W. W. Cross and Company and CIO's Steelworkers. As in the Inland Steel case, the courts and NLRB agree that the company cannot be ordered to bargain on these issues because the steelworkers are not in compliance with the Non-Communist affidavit provision of the Taft Act.

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